



Original  
Instructions

# Installation, Operation and Maintenance Instructions

Grifter - Mono™

| <b>Rev.</b> | <b>Date<br/>dd/mm/yyyy</b> | <b>Reason for Issue</b>   | <b>Prepared<br/>By</b> | <b>Checked<br/>By</b> | <b>Approved<br/>By</b> |
|-------------|----------------------------|---|------------------------|-----------------------|------------------------|
| <b>07</b>   | 02/06/2014                 | Section 4.0 amended - 3rd paragraph of text & next to last paragraph. Priming & filling diagram amended.<br>Section 8.6 amended - 2nd paragraph of text & following diagrams changed.<br>Torque tightening figures added under mechanical seal section. | M. Bailey              | A. Morris             | A. Morris              |
| <b>08</b>   | 17/03/2015                 | Lubrication changed to Rock Oil ISO 100 machine oil (see ECR 510)   | M. Bailey              | C. Griffiths          | C. Griffiths           |
| <b>09</b>   | 05/05/2015                 | Added invertor manual   | M. Bailey              | M. Bailey             | C. Griffiths           |
| <b>10</b>   | 27/01/2017                 | Updated EC Declaration & added Authorised European Distributors list  | M. Bailey              | M. Bailey             | M. Bailey              |
| <b>11</b>   | -----                      | -----   | M. Bailey              | M. Bailey             | M. Bailey              |
| <b>12</b>   | 21/11/2017                 | Added control panel wiring diagram drawings.  | M. Bailey              | M. Bailey             | M. Bailey              |
| <b>13</b>   | 01/10/2018                 | Updated format  | M. Bailey              | M. Bailey             | M. Bailey              |
| <b>14</b>   |                            |   |                        |                       |                        |
| <b>15</b>   |                            |   |                        |                       |                        |
| <b>16</b>   |                            |   |                        |                       |                        |
| <b>17</b>   |                            |   |                        |                       |                        |
| <b>18</b>   |                            |   |                        |                       |                        |
| <b>19</b>   |                            |   |                        |                       |                        |
| <b>20</b>   |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |
|             |                            |   |                        |                       |                        |

# Index

|     |   |           |
|-----|---|-----------|
| 1.  | <b>Revisions</b>                                  | <b>2</b>  |
| 2.  | <b>Index</b>                                      | <b>3</b>  |
| 3.  | <b>Spares &amp; Service Contacts</b>              | <b>4</b>  |
| 4.  | <b>Introduction</b>                               | <b>5</b>  |
| 5.  | <b>EC Declaration</b>                             | <b>6</b>  |
| 6.  | <b>Installation Instructions (Package System)</b> | <b>7</b>  |
| 7.  | <b>Installation (Pump Unit)</b>                   | <b>11</b> |
| 8.  | <b>Installation (Float Level Switch)</b>          | <b>13</b> |
| 9.  | <b>Maintenance and Servicing Grifter Unit</b>     | <b>14</b> |
| 10. | <b>Exploded View Macerator (125mm)</b>            | <b>15</b> |
| 11. | <b>CP25 Pump Dismantling and Assembly</b>         | <b>16</b> |
| 12. | <b>CP800 Pump Dismantling and Assembly</b>        | <b>17</b> |
| 13. | <b>Grifter Control Unit</b>                       | <b>18</b> |
| 14. | <b>Dimensions and Weights</b>                     | <b>19</b> |
| 15. | <b>Capacities and Suction Lifts</b>               | <b>20</b> |
| 16. | <b>Appendix A -Schematic Diagram</b>              | <b>21</b> |
| 17. | <b>Appendix B - Electrical Layout</b>             | <b>22</b> |

# Spares and Service Contacts

## UK

|                |   |
|----------------|---|
| <b>Spares</b>  | +44 (0)161 214 2380 (direct line 8.15 am – 5.00 pm) |
| <b>E-mail</b>  | ManchesterSpares@nov.com                            |
| <b>Service</b> | +44 (0)161 214 2390 (direct line 8.15 am – 5.00 pm) |
| <b>E-mail</b>  | Customer.Services@nov.com                           |
| <b>Service</b> | +44 (0)161 339 9000 (24 hrs)                        |

## France

|                             |                      |
|-----------------------------|----------------------|
| <b>Spares &amp; Service</b> | +33 (0)3 29 94 26 88 |
| <b>E-mail</b>               | monofrance@nov.com   |

## Australia

|                  |                 |
|------------------|-----------------|
| <b>Melbourne</b> | (03) 9773 7777  |
| <b>Sydney</b>    | (02) 8536 0900  |
| <b>Brisbane</b>  | (07) 3350 4582  |
| <b>Adelaide</b>  | (08) 8132 6800  |
| <b>Perth</b>     | (08) 9320 5800  |
| <b>Darwin</b>    | (08) 8931 3300  |
| <b>E-mail</b>    | ozsales@nov.com |

## New Zealand

|                             |                       |
|-----------------------------|-----------------------|
| <b>Spares &amp; Service</b> | +64 (0)9 829 0333     |
| <b>E-mail</b>               | info@mono-pumps.co.nz |

## USA

|                                     |                 |
|-------------------------------------|-----------------|
| <b>Houston Spares &amp; Service</b> | +1 281 854 0300 |
| <b>Ohio Spares &amp; Service</b>    | +1 877 486 6966 |
| <b>E-mail</b>                       | moyno@nov.com   |

## China

|                 |                      |
|-----------------|----------------------|
| <b>Beijing</b>  | +86 (0) 10 5707 0900 |
| <b>Shanghai</b> | +86 (0) 21 3990 4558 |
| <b>E-mail</b>   | monoshanghai@nov.com |

## Distributors

For local distribution, please refer to our website:

[www.mono-pumps.com/en-uk/sales\\_network](http://www.mono-pumps.com/en-uk/sales_network)



# Introduction

This information, and all the information contained herein, is the exclusive property of your Supplier, and contains information of a proprietary nature. It is provided for the sole purpose of transmitting the information contained to the designated recipient.

This information is to be used only as specified in the instrument of transmittal. It is not to be reproduced, copied in whole, or in part, nor is information it contains to be disclosed in any manner without the written consent of the Supplier. Its use for any other reason than the specified shall be a violation of the agreement with the recipient concerning the legal rights of the Supplier.

The Supplier reserves the rights to make changes which may obsolete certain parts of this manual.

This manual gives a guide to the operation and maintenance of the Grifter given that all Health and Safety and good engineering practices are observed.

# EC Declaration as defined by Machinery Directive 2006/42/EC.

The following harmonised standards are applicable: BS EN ISO 12100: 2010

## **EC Declaration of Incorporation**

This declaration is only valid when partly completed machinery has been supplied.

In this case, the machinery meets the requirements of the said directive and is intended for incorporation into other machinery or for assembly with other machinery in order to constitute relevant machinery as defined by the said directive including any amendments, which are valid at the time of supply.

### **IMPORTANT**

This machinery must not be put into service until the relevant machinery into which it is to be incorporated has been declared in conformity to the said directive.

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with these instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.

## **EC Declaration of Conformity**

This declaration is not valid for partly completed machinery that has been supplied.

In this case the machinery meets the requirements of the said directive including any amendments which are valid at the time of supply.

We further declare that, where applicable, said machinery also meets the requirements of:

The EMC Directive 2014/30/EU  
The Low Voltage Directive 2014/35/EU  
The Pressure Equipment Directive 2014/68/EU

### **IMPORTANT**

This declaration is only valid when the machinery has been installed, operated and maintained in accordance with these instructions and safety guidelines contained within as well as instructions supplied for equipment assembled with or intended for use with this equipment.



**Mr A. Morris - Director of Pump Technology for  
NOV PFT UK Ltd., Greengate Way, Middleton,  
Manchester, England, M24 1SA.**

# Installation and Operation

## 1.0 MATERIALS OF CONSTRUCTION: MACERATOR

### Body:

Shall be of cast iron to BS 1452 grade 220/260.

### Impeller:

Carbon chromium molybdenum Steel, hardened and tempered.

### Cutting Ring:

Carbon chromium tool steel, hardened.

### Mechanical Seal:

Oil lubricated mechanical seal carbon/ceramic, mounted external to process liquid.

## MATERIALS OF CONSTRUCTION: PUMP

### Body & Endcover:

Impact resistant non-contaminating acetal copolymer.

### Rotor:

Stainless steel 316 S31 to BS 970 PT 3.

### Stator:

Free moulded resilient nitrile rubber.

### Seal:

Mechanical seal carbon / ceramic.

### Finish:

Standard paint finish is 1 coat primer and 1 coat hammer finish enamel gloss, to provide long term effective surface protection from the environment.

## 1.1 Noise Level

The airborne noise emission of the Pump Station does not exceed 70dB(A).

## 2.0 OPERATING PRINCIPLE

Designed to operate as a small sewage pumping station the Grifter Package Pump Station consists of two (duty & standby) grinding pump units housed in a GRP weatherproof kiosk. For ease of access the kiosk has a hinged lid an integral part of which is the electrical control panel.

The pump & grinder (Macerator) unit consists of a single motor driving the grinder from one end of the motor and the pump from the other end.

The macerator is a rotary cutter / impeller type grinder operating within a stationary cutting ring and the pump is a progressive cavity, positive displacement type.

Both units are fitted with interconnecting discharge pipework with non-return and gate valves and terminates in one common outlet connection.

The progressive cavity pump which after initial start-up, is self priming, induces the sewage through the macerator where it is ground before being discharged through the pump to the common discharge outlet.

The station is operated by the control panel which is designed to control either a single or double motor unit and operates automatically by either float switches or level controls.

## 3.0 INSTALLATION INSTRUCTIONS (PACKAGE SYSTEMS)

Correctly installed and maintained the Grifter will give years of trouble-free operation - failure to follow instruction in this booklet are likely to cause premature equipment failure and high ongoing maintenance costs.

These Grifters are designed to handle **normal domestic sewage** and, whilst they will tolerate reasonable quantities of paper and rag, etc., economical life of essential components will be reduced, should, for instance, sink grinder waste containing glass, bone and metal scouring pads enter the tank. Care should also be taken to eliminate wet strength padded nappies from a Grifter system, also they must not be used on industrial or commercial applications where excessive quantities of rags or similar materials are present in the system. Surface water should be excluded from a system which incorporates a Grifter.

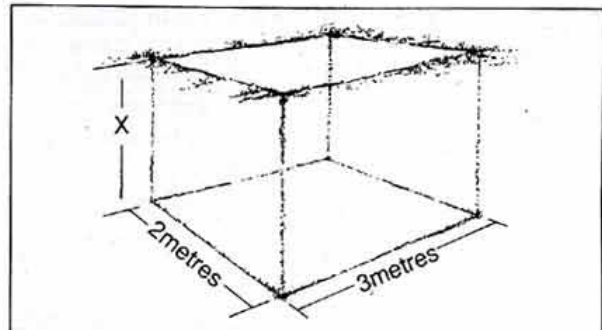
### UNDER NO CIRCUMSTANCES SHOULD A GRIFTER BE INSTALLED WHERE IT WILL BE SUBJECT TO FLOODING

## 3.1 PREPARING THE SITE

It is important that before civil work starts, an investigation of the selected site is made, through which the water table and nature of ground can be established.

These factors together with the invert level will have some influence on the depth at which the unit is finally positioned but care must be taken to ensure that neither buoyancy nor damage to the electric motor can occur through possible flooding - anti-flotation plates on the sump are available at time of ordering (to overcome buoyancy problems).

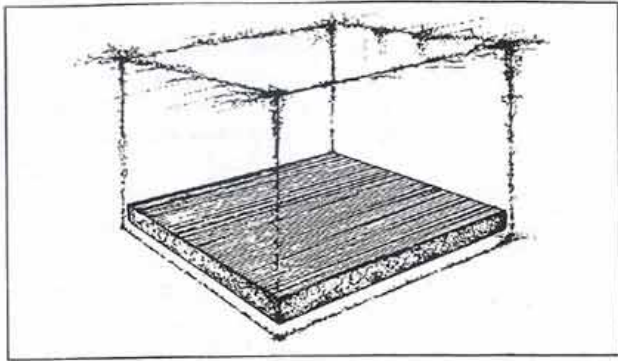
Once a suitable site has been selected a hole should be excavated approximately 3 metres x 2 metres x a depth corresponding with the depth of tank ordered plus the plinth.



E.g., 1.2m deep sump + 150mm = 1.35m  
A foundation slab should be cast having a minimum thickness of 150mm.

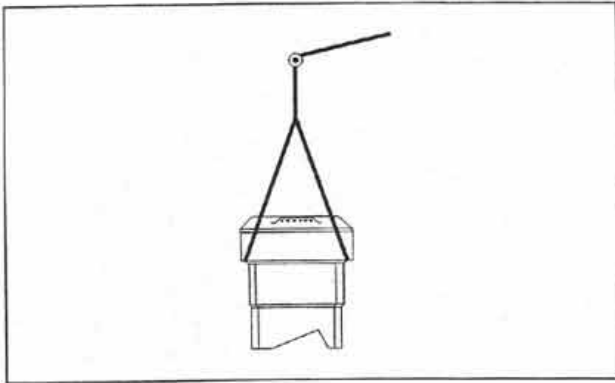
Once the foundation slab has had sufficient time to harden, the site is ready to accept the Grifter system.



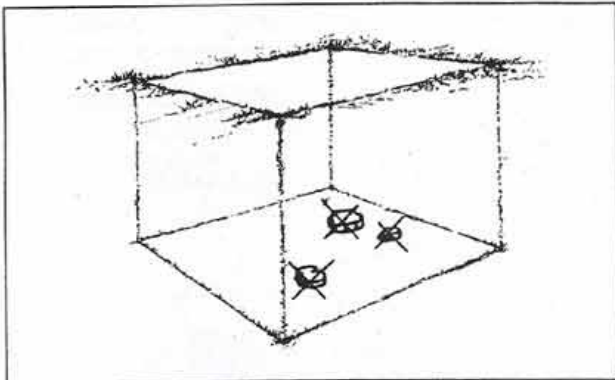


### 3.2 OFFLOADING AND INSTALLATION

The Grifter system should be offloaded using suitable slings, taking care not to damage the G.R.P enclosure and sump.

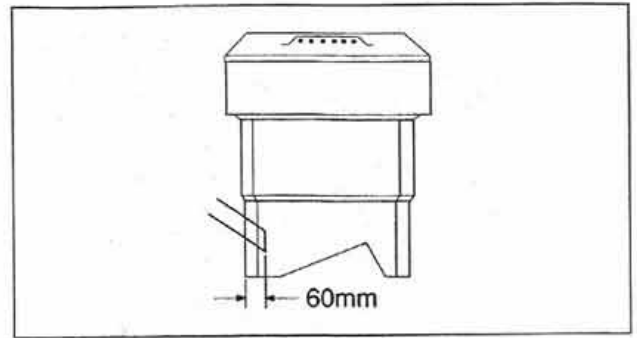


Before lowering the system onto the preformed base slab ensure that the base is smooth and cleared of any builders rubble. (Sharp stones, etc., could puncture the sump).



### 3.3 PIPEWORK CONNECTIONS CONNECTION OF PIPEWORK (INVERT)

It is recommended that the raw sewage gravity inlet pipe and the overflow pipe to the emergency soak away (if required) protrude into the tank by approximately 60mm. Holes for the pipes should, if possible, be cut into the flat sections of the tank and sealed with a suitable grade of Denso Mastic or similar tape. The inlet pipe should not be sited adjacent to the level control.



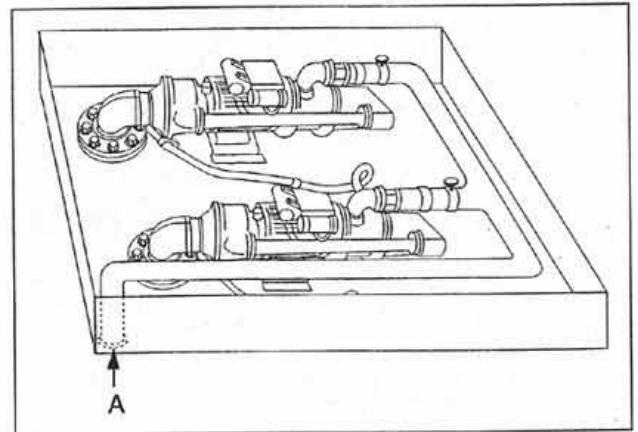
Alternatively polypropylene or similar couplings to suit specific pipe materials can be obtained through Builders Merchants.

In case of doubt, however, guidance on accepted practice should be obtained from the Local Authority concerned.

After cutting holes, care should be taken to remove any pieces of fibreglass which may have fallen inside the tank.

### 3.4 CONNECTION OF PIPEWORK (DELIVERY AND TANK VENT)

The rising main should be connected to the pump discharge pipework at A in accordance with accepted engineering practice.

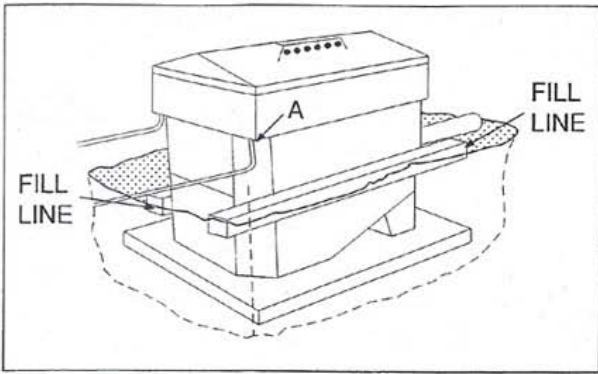


### 3.5 BACKFILLING (INITIAL)

Once all the electrical and pipework connections have been completed it is recommended that the sump will be filled with water to a level just above the invert pipe to check for any leakage.

Having checked that there are no leaks backfilling can be partially completed (using a suitable smooth medium e.g., sieved soil) up to the rising main connection.

If anti-floatation plates are fitted back fill first 250mm with concrete to anchor in the tank.



### 3.6 ELECTRICAL CONNECTIONS

**ALL ELECTRICAL CONNECTIONS SHOULD BE IN ACCORDANCE WITH LOCAL CODES USING WIRE SIZES APPLICABLE TO MOTOR CURRENT AND VOLTAGE AND SHOULD BE COMPLETED BY A SUITABLE QUALIFIED ELECTRICIAN**

The Grifter package units are supplied completely pre-wired requiring only a power supply connected to be made into the unit isolator provided.

On single phase units (240v) the isolator is of a non fuse type (single phase and neutral) on three phase units (415v) the isolator is of a non fused type (3 pole and neutral).

It is recommended that the supply should be provided via an independent fused isolator. 10mm rating for 3 phase supply, 20 amp rating on single phase.

Connection to the Grifter unit should be with five core (3 phase neutral and earth) P.V.C. SWA cable, together with appropriate weatherproof gland terminators, at both the control panel and grifter unit.

Earth return should maintain continuity via the wire armour through to the supply earth.

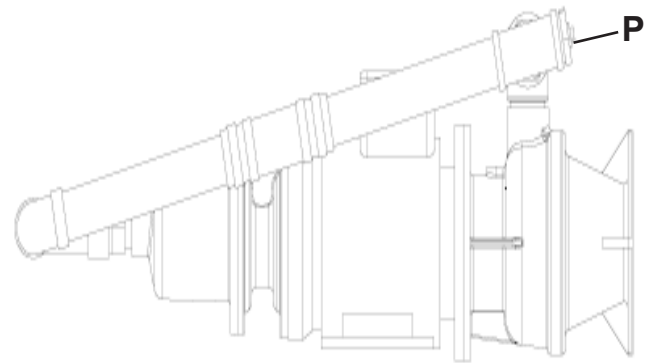
**ALL ELECTRICAL CONNECTIONS SHOULD BE COMPLETED TO ANY LOCAL AND I.E.E. REQUIREMENTS. IF IN DOUBT CONSULT A QUALIFIED ELECTRICAL ENGINEER.**

### 4.0 STARTING THE EQUIPMENT

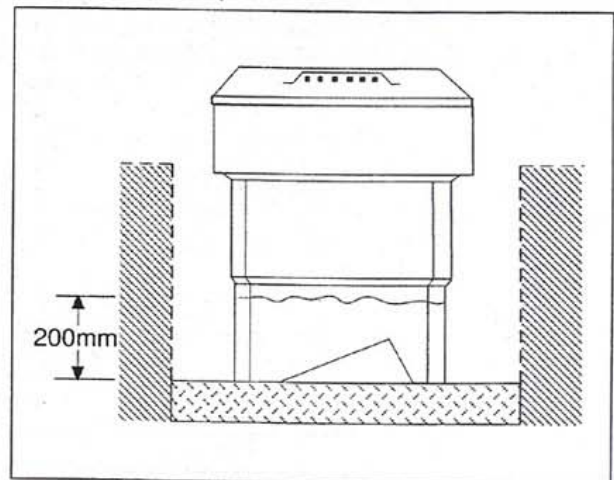
**FILL THE PUMP(S) WITH LIQUID BEFORE STARTING - NEVER RUN THE PUMP DRY**

**IMMEDIATE DAMAGE TO THE PUMP ELEMENT WILL BE CAUSED IF THE GRIFTER UNIT IS ALLOWED TO OPERATE WITHOUT LIQUID IN THE PUMP OR TANK.**

The plug P' on the elbow is for filling purposes. This should be removed and the pump filled with water, after which the plug should be replaced, taking care to avoid air leaks by the use of a suitable jointing compound.

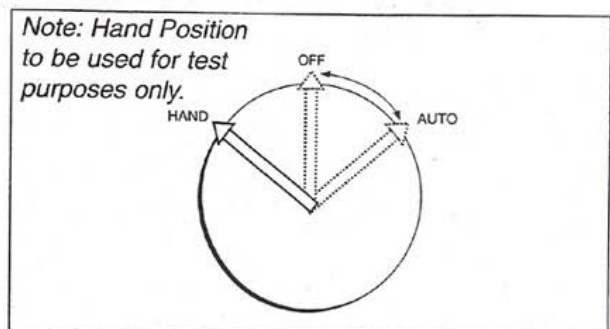


This procedure is only necessary on initial start-up or after draining for maintenance or other purposes. **IT IS MOST IMPORTANT THAT THE VALVE(S) ON THE PUMP DELIVERY PIPE(S) ARE FULLY OPEN** and that there is at least 200mm (8") of liquid in the tank.



The Grifter units are now ready for initial start-up and check.

On duty/standby systems select the off position for one unit on the control panel and switch the other to 'Auto'. Check immediately the direction of rotation.



If the unit does not run it may be that there is not sufficient water in the tank.

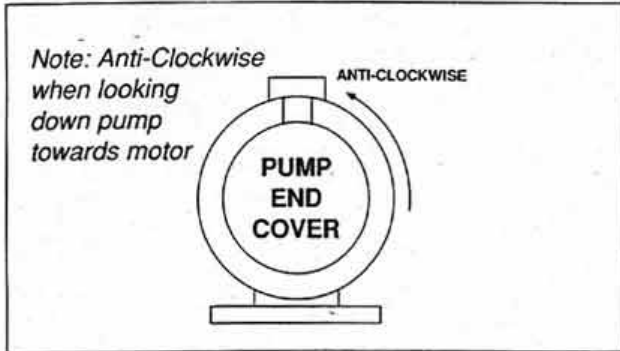
This being the case the direction of rotation can be checked by briefly switching the control to the 'hand' position.

Once the direction of rotation has been confirmed correct - switch both control switches to the 'auto' position. (See Section 8.6 for the complete pump unit startup procedure.)



**NOTE:** It should be left in 'hand' as a dry run can occur. The unit should rotate in an anti-clockwise direction when looking at the pump end, towards the motor, (this is also indicated by arrow on the macerator body).

If the direction is incorrect **STOP IMMEDIATELY** to prevent damage and re-wire the incoming power supply to give correct direction of rotation.



Continue the test run period by opening household and / or service water taps and check for any leakages at pump discharge connections.

Check the high level indicators by allowing water into the sump with unit switched off taking care not to overflow and flood the kiosk - then switch on and note that high level indication clears.

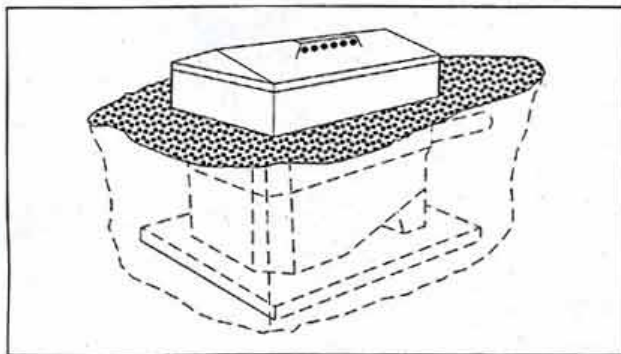
Check that the level control is controlling the unit at normal operating level as detailed.

The system is arranged to run on an alternate start - auto-sequencing operation to keep the wear on the two units even.

The unit is now ready for normal, fully automatic use.

## 5.0 BACKFILLING

Having checked that there are no leaks backfilling can be completed, again using sieved soil or similar smooth medium.

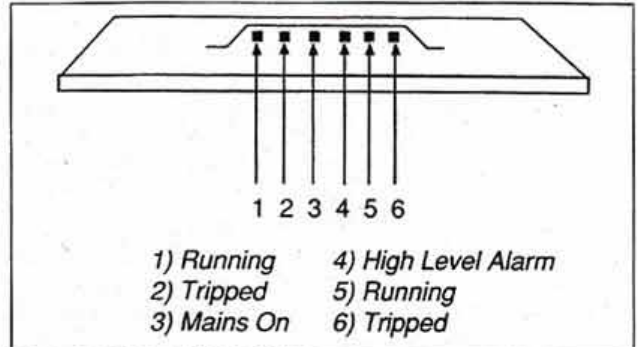


## 6.0 INDICATOR LIGHTS

The Gritter is supplied with indicator lights which should be easily visible for day to day observation.

Check the condition regularly. Serious damage will likely occur if warning lights are ignored.

If the HIGH LEVEL lamp is lit investigate the cause **IMMEDIATELY**.



## 7.0 FAULT FINDING

### 7.1 STATIC OR INCREASING LIQUID LEVEL

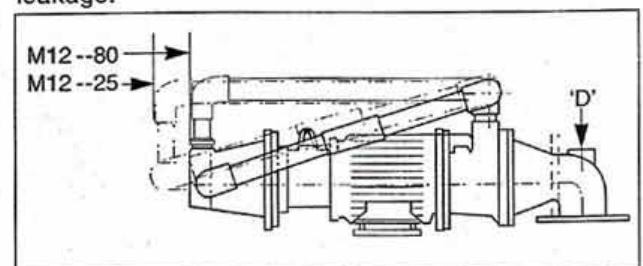
This would suggest one, or a combination of the following:

- Control breaker tripped.
- Incorrect direction of unit rotation.
- Restriction in the Vertical suction pipe or macerator.
- Restriction in the check valve or delivery pipeline.
- Damaged pump element.
- Movement of level control restricted at low level.
- Damaged mechanical seal in the macerator or pump.

Having checked all breakers, freedom of level switch and direction of rotation, the total discharge pressure should be checked by fitting a reliable pressure gauge on the outlet pump. Should the reading substantially exceed the calculated total head or the maximum design pressure for the pump (3.06kg/sq. cm) or 3.5 Bar) stop the unit immediately and make certain that the check valve and remainder of delivery pipe is free of obstruction.

Should no restriction or blockage be found having determined that the high pressure is below the designed rating for the pump, put the Gritter into service.

Should a static liquid level in the tank be observed in conjunction with no recorded discharge pressure, stop the pump immediately and locate the blockage. This could be in the vertical suction pipe, the macerator, or connecting pipe between the pump and macerator. The suction pipe can be cleared by removing the plug 'D' and then rodding the pipe. Once clear the plug should be replaced using PTFE or a similar sealing media to prevent leakage.



Time can be saved by fitting a reliable vacuum gauge to the pump priming connection on the suction side as in the event of restriction this will immediately be revealed by a reading well in excess of approximately 3" HG (76mm HG) which can be taken as an average figure for normal use in conjunction with a fibreglass tank.

## 7.2 UNIT FAILS TO STOP AT LOW LEVEL

Check movement of level switch and hose down inside of tank, ensuring that all accumulated solids on the level switch, cable and tank bottom are removed if these are likely to cause damage to the macerator or pump.

## 8.0 INSTALLATION INSTRUCTIONS (PUMP UNIT)

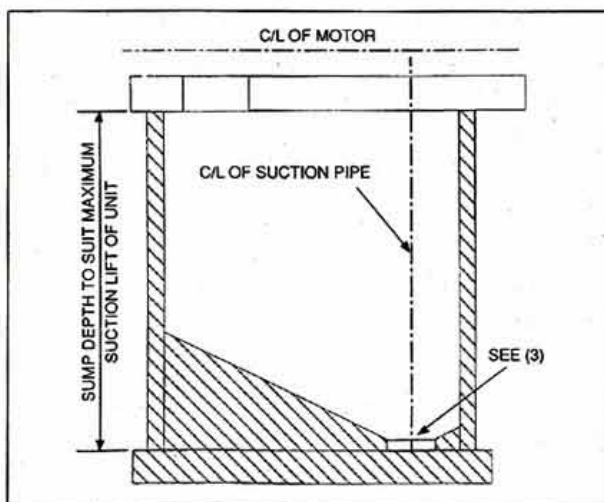
Correctly installed and maintained the Grifter will give years of trouble-free operation - failure to follow instructions in this booklet will likely give premature equipment failure and high ongoing maintenance costs.

These grifters are designed to handle **Normal Domestic Sewage** and, whilst they will tolerate reasonable quantities of paper and rag, etc., economical life of essential components will be reduced, should, for instance, sink grinder waste containing glass, bone and metal scouring pads enter the tank. Care should also be taken to eliminate wet strength padded nappies from a Grifter system, also they must not be used on industrial or commercial applications where excessive quantities of rags or similar materials are present in the system. Surface water should be excluded from a system which incorporates a Grifter.

**UNDER NO CIRCUMSTANCES SHOULD A GRIFTER BE INSTALLED WHERE IT WILL BE SUBJECT TO FLOODING**

### 8.1 POSITION OF UNIT

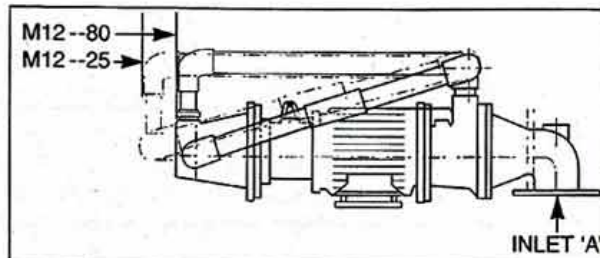
The unit should be positioned over the tank with the motor horizontal.



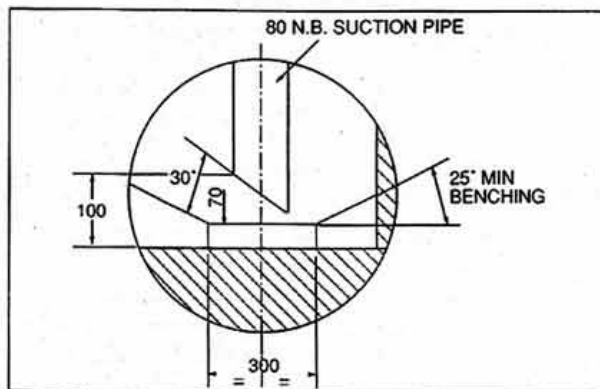
### 8.2 CONNECTION OF PIPEWORK

The suction pipe should be installed vertically into the tank use 90° inlet at point 'A'. Great care should be taken to ensure any joints on the suction side are completely sealed.

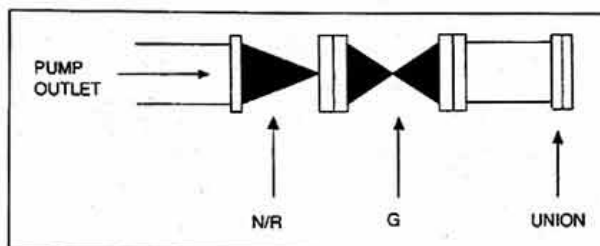
Any leakage will result in decreased performance and could damage the rotating parts of the unit.



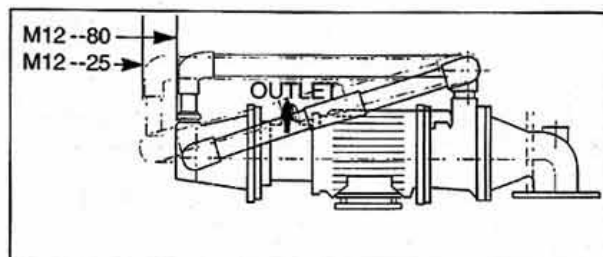
We recommend the use of an 80mm bore suction pipe which should be installed with the lower end cut at 30° to the horizontal and approximately 100mm off the tank bottom. The Tank bottom should be steeply benched towards the suction pipe.



It is recommended that a full way non-return valve and gate valve be fitted on the pump outlet at point B and the rising main then connected to the outlet of the gate valve taking care to ensure all joints are leak free.



Valves and pipework should be a minimum internal diameter of 25mm for the M12--25 and 32mm for the M12--80 units.



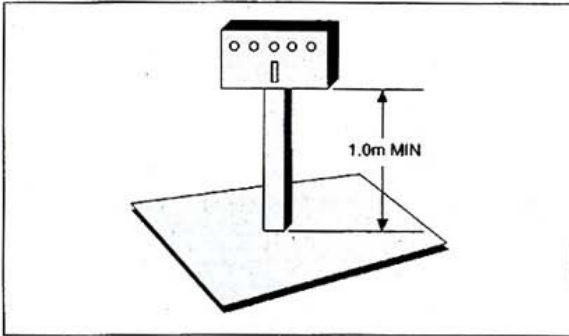


### 8.3 FROST PROTECTION

The Gritter unit should be protected from frost damage, by fitting adequately rated anti-condensation heaters and trace-heating or by thermal insulation of the system.

### 8.4 CONTROL PANEL

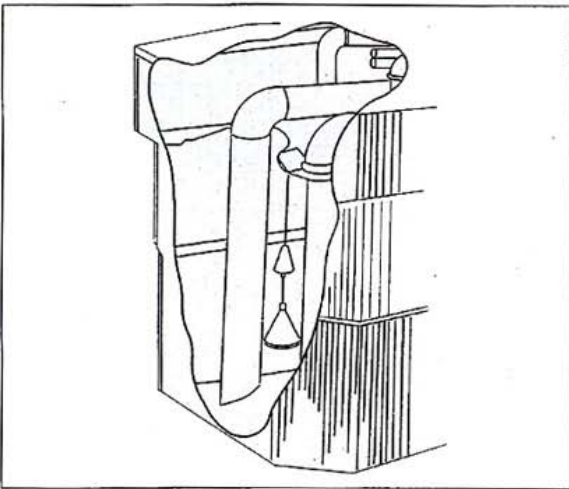
Where supplied, the control panel should be installed vertically in a clean and dry position with adequate protection from weather and accidental flooding. All wiring should be done in accordance with local and I.E.E. Regulations. Separate cables should be used for the motor and level controls and level control cable should be screened.



### 8.5 LEVEL CONTROL

The unit should always be operated via an automatic level control system to prevent dry running.

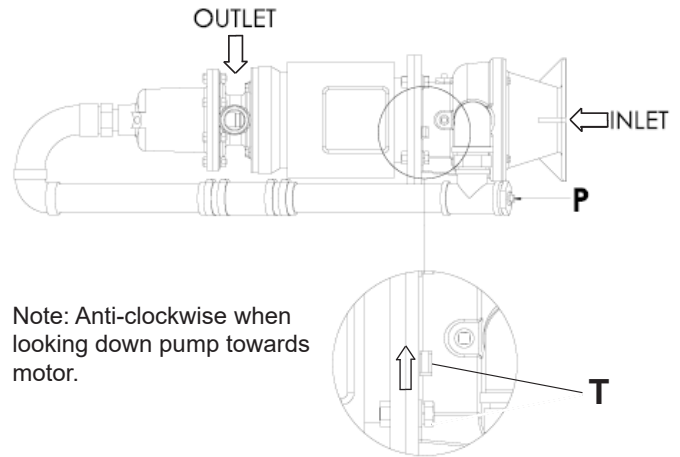
Where supplied the float switch should be installed as shown on page 8.



### 8.6 START-UP AND OPERATION

Before start-up it is essential that **THE PUMP UNIT IS FILLED WITH WATER** and the outlet valve is fully opened. Immediate damage to the pumping equipment will be caused if the Gritter unit is allowed to operate dry, or against a closed valve.

Initial filling of the pump can be achieved by removing the plug 'P' from the swept tee elbow. A water source should be used to fill the pump and the pipework up to this point, after which the plug should be replaced.



Note: Anti-clockwise when looking down pump towards motor.

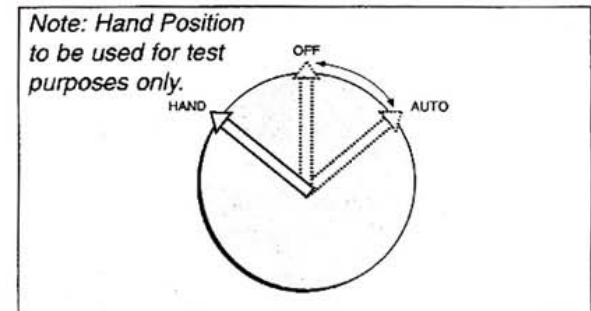
On start-up immediately check the direction of rotation. The unit should rotate in an anticlockwise direction when looking at the pump end towards the motor (This is also indicated by an arrow on the macerator body).

The direction of rotation can be identified by noting the rotation of the thrower 'T' through the slots in the macerator body, as shown in the priming diagram.

If the direction is incorrect **STOP IMMEDIATELY** to prevent damage and re-wire the controls to give correct direction of rotation.

The Gritter unit should never be operated manually where a dry-run could occur, i.e., switch in 'hand' position.

Adequate level controls should be incorporated in the system, to prevent this, and the system operated in the automatic mode.



### LUBRICATION

Oil level should be half-way up the sight glass located on the macerator body.

Top up if necessary using Rock Oil ISO 100 machine oil or equivalent.



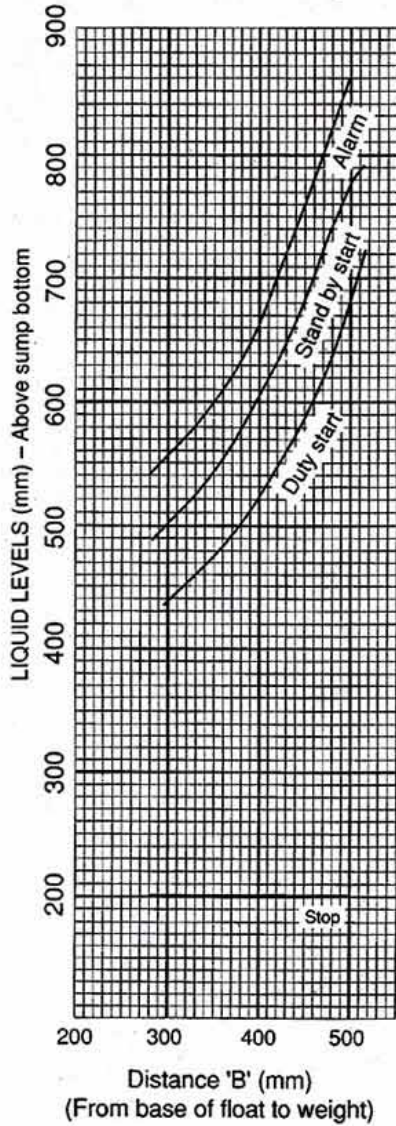
# Installation Float Switch

## 8.7 FLOAT SWITCH OPERATING LEVELS - INSTALLATION GUIDE

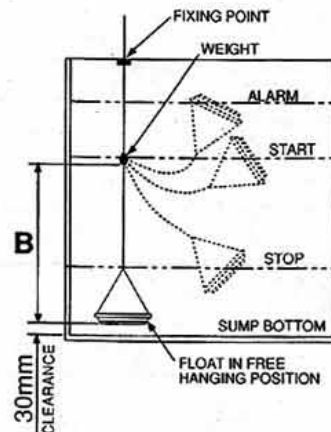
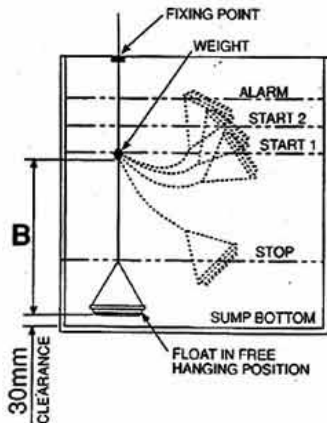
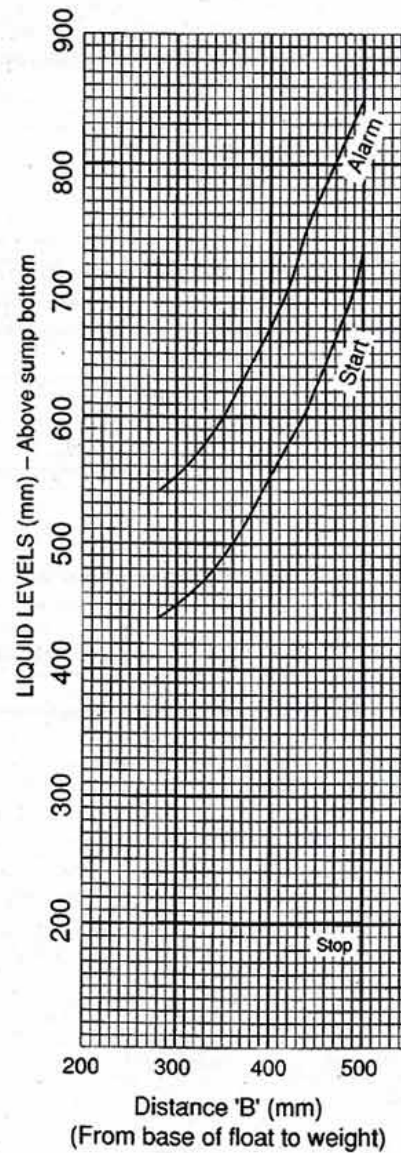
NOTE: Levels may vary between switches. Final adjustment should be made under actual pumping conditions. It is recommended that Dimension 'B' is maintained at 300mm in order

to give more frequent evacuation, to minimise settlement of solids and to provide capacity for reception of larger 'flash' inflows.

For use with  
'KARI' float switch No. 4Y5E Dual Unit



For use with  
'KARI' float switch No. 3YE Single Unit



# Maintenance and Servicing

## 9.0 MAINTENANCE AND SERVICING THE GRIFTER UNIT

ENSURE THE POWER SUPPLY TO THE UNIT IS ISOLATED AND PADLOCKED

### 9.1 REMOVAL OF THE GRIFTER

- (1) Having ensured the electricity supply to the unit has been isolated from the motor terminal cover, disconnect the supply cable making due note of the numbers and connections.
- (2) Disconnect the inlet casing (23) by removing the bolts and washers (15,16,17) and the 'O' ring seal (5).
- (3) Disconnect the discharge pipework at the nearest point to the pump outlet.
- (4) Remove bolts from the motor mounting plate and remove the Grifter to a suitable position for maintenance or servicing.

### 9.2 MACERATOR END

**DISASSEMBLY**  
REFER TO DRAWINGS 60A0032 (PAGE 10)

#### CUTTER RING

- (1) The cutter ring (2) can be gently eased out of the macerator body (1) using a lever.
- (2) The cutter ring can then be inspected for wear and replacement if necessary.

#### IMPELLER

- (1) Remove the locknut (9) and washers (7,8) (locknut is left hand thread).
- (2) Remove the impeller (4) from the shaft complete with brass washer (6), (a special tool can be purchased from Mono Pumps Ltd), and inspected for wear or damage.

#### MECHANICAL SEAL

- (1) Remove the oil bath drain plug (28) and drain oil.
- (2) Remove the seal retaining boss (11).  
Note:- This has a right hand thread (a special spanner can be purchased from Mono Pumps Ltd) and sealing washer (12).
- (3) Remove the rotating part of the seal complete with pressure spring from the shaft sleeve (19).

The static seal face can be carefully withdrawn from the recess in the retaining boss for inspection.

#### Note:

- Tightening torques for section 9.3 step 8 can be found on page 10.
- It is recommended that the castings and pipework are inspected periodically and checked for corrosion, cracks etc.

### REAR OIL AND SEAL SLEEVE

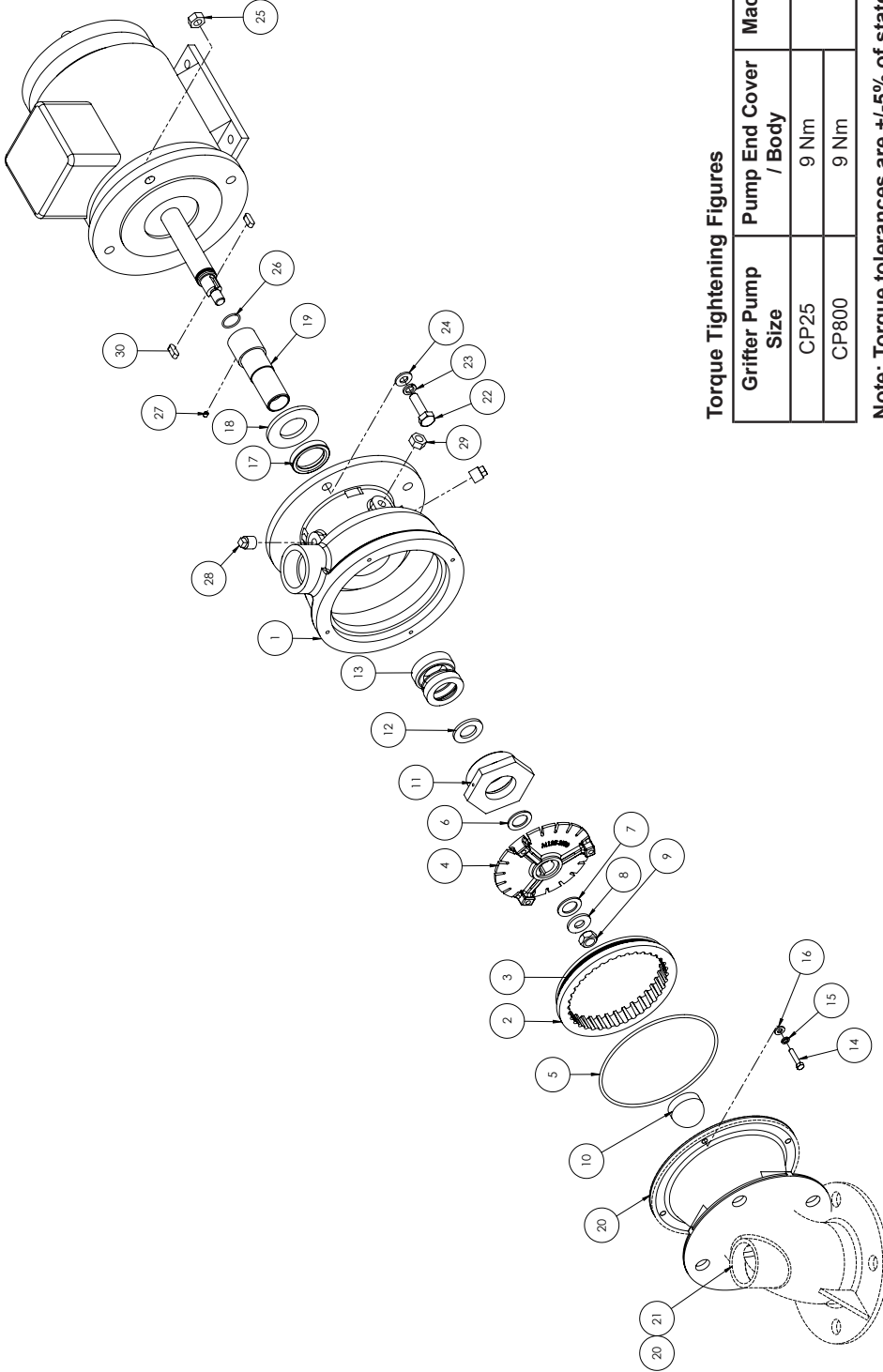
- (1) Remove motor to body retaining hardware (22,23,24,25).
- (2) Carefully extract the macerator body (1) taking care not to damage the shaft.
- (3) The oil seal (17) can now be carefully removed for replacement.
- (4) The seal sleeve (19) can now be replaced if necessary by removing the grub screw (27) and pulling off the sleeve.

### 9.3 ASSEMBLY

- (1) Fit 'O' ring (26) and key (30) to the motor shaft.
- (2) Press on new sleeves (19) and lock into position with grub screw (27) and fit thrower (18) onto larger diameter of sleeve.
- (3) Press oil seal (17) into macerator body.
- (4) Carefully fit the body onto the motor flange ensuring that no damage occurs to the oil seal (17) and fit all retaining hardware (22,23,24,25).
- (5) Fit the rotating element of the mechanical seal to the shaft sleeve and ensuring that the recess in the static race lines up with the pin within the retaining boss, fit the retaining boss (11) and seal (12) using a sealant/adhesive compound such as Stag. A. on the retaining boss thread.
- (6) Fit the impeller (4) and retaining hardware (7,8,9).  
The impeller locknut (9) should be tightened to a torque of 52nm.  
  
Finally fit the nut cap (10).
- (7) Place the 'O' ring (3) into the groove on the outside of the cutter ring (2) and carefully press the cutter ring into the main body (1).
- (8) Fit the end cover (20) and 'O' ring (5) using retaining hardware (14,15,16).
- (9) Ensure oil bath plug is tightened correctly and fill with oil until level can be seen half way up the sight glass (29).

Refit filler plug (28).

# Exploded View - Macerator (125mm)



## Torque Tightening Figures

| Grifter Pump Size | Pump End Cover / Body | Macerator Inlet / Body |
|-------------------|-----------------------|------------------------|
| CP25              | 9 Nm                  | 9 Nm                   |
| CP800             | 9 Nm                  | 9 Nm                   |

Note: Torque tolerances are +/-5% of stated figures.

| ITEM | PART NO.  | DESCRIPTION     | QTY | ITEM | PART NO.  | DESCRIPTION       | QTY | ITEM | PART NO.  | DESCRIPTION        | QTY |
|------|-----------|-----------------|-----|------|-----------|-------------------|-----|------|-----------|--------------------|-----|
| 1    | M125 0100 | MAIN CASTING    | 1   | 12   | M125 4560 | SEALING WASHER    | 1   | 21   | P100832S  | PLUG               | 1   |
| 2    | M125 3000 | CUTTER RING     | 1   | 13   | W40533    | MECHANICAL SEAL   | 1   | 22   | F114261F  | HEX. HD. SCREW     | 4   |
| 3    | W40529    | TORL SEAL RING  | 1   | 14   | F112201F  | HEX. HD. SCREW    | 4   | 23   | W114251F  | SPRING WASHER      | 4   |
| 4    | M125 3500 | IMPELLER        | 1   | 15   | W112251F  | SPRING WASHER     | 4   | 24   | W114051F  | PLAIN WASHER       | 4   |
| 5    | S305360P  | TORL SEAL RING  | 1   | 16   | W112050F  | PLAIN WASHER      | 4   | 25   | N114100F  | HEX NUT            | 4   |
| 6    | M125 4551 | SEAL WASHER     | 1   | 17   | S355351P  | LIPSEAL           | 1   | 26   | W40535    | TORL SEAL RING     | 1   |
| 7    | M125 4550 | SEAL WASHER     | 1   | 18   | E051 4200 | THROWER           | 1   | 27   | G110061F  | HEX. SOC. SETSCREW | 1   |
| 8    | M125 4700 | LOCK WASHER     | 1   | 19   | M125 4501 | SHAFT SEAL SLEEVE | 1   | 28   | P130332S  | PLUG               | 2   |
| 9    | N845201F  | LEFT HANDED NUT | 1   | 20   | M125 0200 | INLET - STRAIGHT  | 1   | 29   | W40537    | WINDOW NUT         | 1   |
| 10   | W40527    | NUT SHEATH      | 1   |      | M125 0201 | INLET - 90°       | 1   | 30   | K1500618P | KEY                | 2   |
| 11   | M125 4000 | RETAINING BOSS  | 1   |      |           |                   |     |      |           |                    |     |



# Dismantling and Assembly - CP25

## 9.5 PUMP (CP25) DISASSEMBLY

### STATOR (2)

Undo the eight nuts (8) and remove bolts (7) to release the End Cover (1). Remove End Cover and Stator Support Ring (13) with 'O' ring (11). The Stator may now be removed.

### ROTOR (4)

Holding the end of the motor shaft with the special spanner, place a second spanner on the flats of the Rotor. By rotating anti-clockwise the Rotor may be removed, taking care that the mechanical seal is not damaged. Should the Stub Shaft (12) come away with the Rotor, they may be separated by turning in opposite directions as stated in previous paragraph, holding the Stub Shaft with a spanner on the flats provided.

### MECHANICAL SEAL (6)

This component is entirely self adjusting in service and needs no maintenance.

Removal of the Rotor (4) either with or without the Stub Shaft (12) will release the moving parts of the Mechanical Seal which may then be slid off the Stub Shaft.

To remove the static seat of the Mechanical Seal, undo the four nuts at the Motor/Body flange and remove the bolts and washers. The body (5) may then be removed from the motor. Care should be taken to ensure the static seat does not touch the shaft.

After removing the Body from the motor, the static seat may be removed by hand from the body.

## 9.6 PUMP (CP25) ASSEMBLY

### STUB SHAFT, MECHANICAL SEAL AND BODY

Screw Stub Shaft (12) onto Motor Shaft (ensuring that it screws up the full distance, hard against motor shaft shoulder). Tighten in Position.

Replace static seat of Mechanical Seal (6) in Body (5).

Ensure that working face is exposed. Pass Body (5) and Static Seat to touch Stub Shaft (12) and engage body flange on motor flange spigot. Do not allow static seat to touch Stub Shaft. Ensure that bolt holes are aligned, enter bolts, screw on nuts with washers and tighten in position.

### ROTOR

Pass moving half of Mechanical Seal (6) along Stub Shaft (12). Holding the spring locating washer, enter the Rotor (4) onto the Stub Shaft. Ensure that the spring locating washer is not caught between Rotor (4) and the Stub shaft (12). Tighten rotor in position.

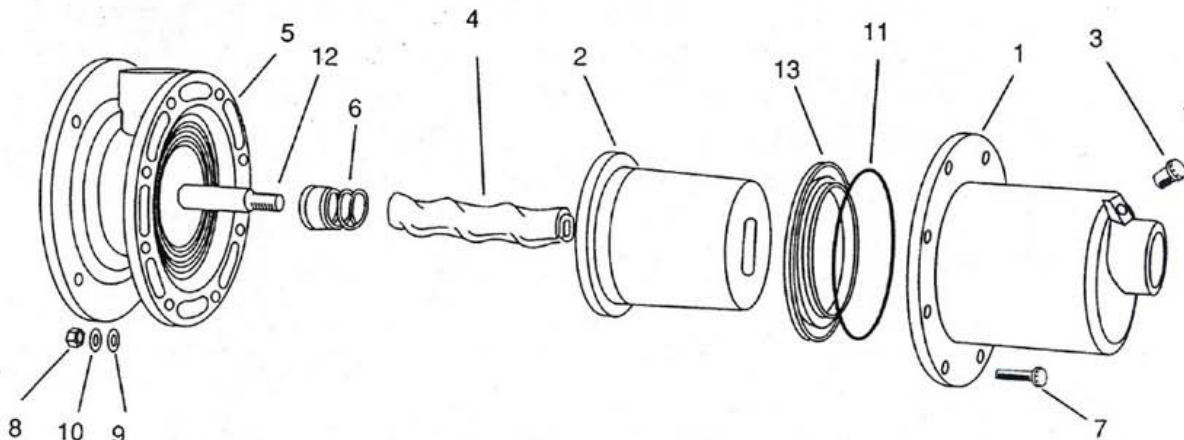
### STATOR AND END COVER

Place Stator (2) over Rotor and bring flange up to grooved face and body (5). Place Stator Support Ring (13) on Stator (2). Place 'O' Ring (11) in Position. Place End Cover (1) over Stator (2) ensuring that locating dowel is to the bottom. Insert bolts (7). screw on nuts (8) and tighten in

#### Note:

- Tightening torques for section 9.6 "Stator and End Cover" assembly can be found on page 10.
- Do not forget to remove filling plug (3) to fill pump with liquid prior to starting.

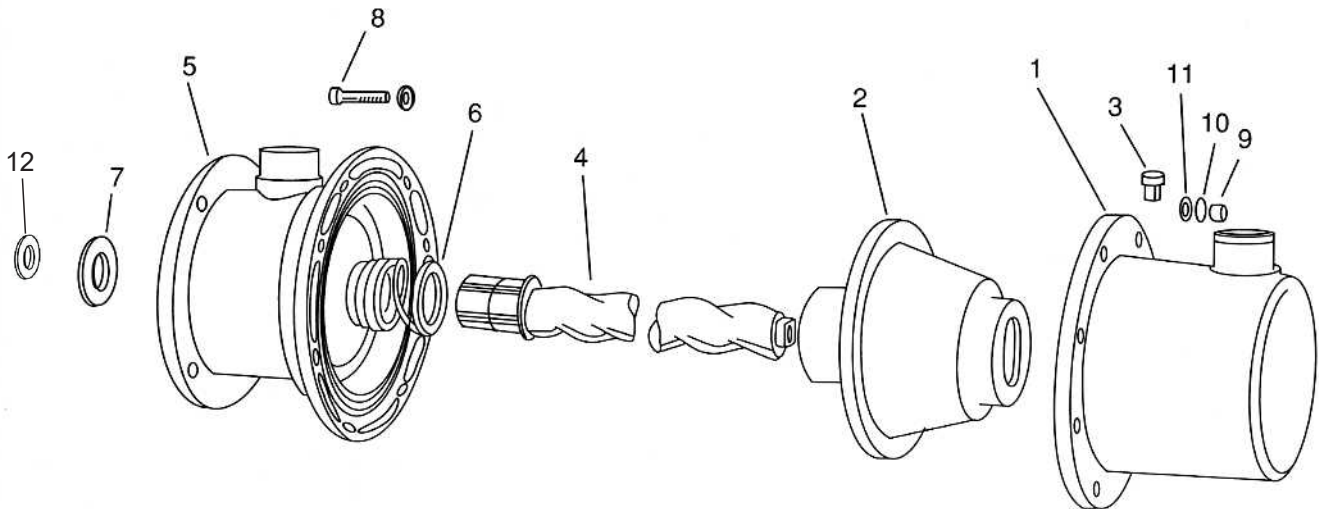
## 9.7 GRIFTER M12--25 - EXPLODED VIEW OF PUMP (CP25)



| ITEM | PART NO.  | DESCRIPTION     | QTY | ITEM | PART NO.    | DESCRIPTION         | QTY |
|------|-----------|-----------------|-----|------|-------------|---------------------|-----|
| 1    | CP11 2400 | END COVER       | 1   | 8    | N113102F    | HEX. NUT            | 8   |
| 2    | M25 2200  | STATOR          | 1   | 9    | W113052F    | PLAIN WASHER        | 8   |
| 3    | CP00 0430 | PLUG            | 1   | 10   | W113252F    | SPRING WASHER       | 8   |
| 4    | CP25 2520 | ROTOR           | 1   | 11   | (MPK-SK011) | TORL SEAL RING      | 1   |
| 5    | CP11 0100 | BODY            | 1   | 12   | CP25 3210   | STUB SHAFT          | 1   |
| 6    | MPK-SK011 | MECHANICAL SEAL | 1   | 13   | CP25 4700   | STATOR SUPPORT RING | 1   |
| 7    | K113242F  | HEX. HD. BOLT   | 8   |      |             |                     |     |

# Dismantling and Assembly - CP800

## GRIFTER M12CP80 - EXPLODED VIEW OF PUMP (CP800)



| ITEM | PART NO.   | DESCRIPTION     | QTY | ITEM | PART NO.  | DESCRIPTION        | QTY |
|------|------------|-----------------|-----|------|-----------|--------------------|-----|
| 1    | CP800 2400 | END COVER       | 1   | 7    | D30 4200  | THROWER            | 1   |
| 2    | CP800 2200 | STATOR          | 1   | 8    | K113282F  | HEX. HD. BOLT      | 8   |
| 3    | CP00 0430  | PLUG            | 1   | 9    | N113102F  | HEX. NUT           | 8   |
| 4    | CP800 2520 | ROTOR           | 1   | 10   | W113252F  | SPRING             | 8   |
| 5    | CP800 0100 | BODY            | 1   | 11   | W113052F  | PLAIN WASHER       | 8   |
| 6    | CP800 1060 | MECHANICAL SEAL | 1   | 12   | 52/C13093 | ROTOR DIST. COLLAR | 1   |

### 6. PUMP (CP800) DISASSEMBLY

#### STATOR (2)

Undo the eight nuts, (9) and remove bolts, (8) to release End Cover (1). Remove End Cover. The Stator (2) may now be removed.

#### ROTOR (4)

Holding the end of the motor or bearing shaft with a spanner, place a second spanner on the flats of the Rotor. By rotating anti-clockwise, the Rotor may be removed, taking care that the Mechanical Seal (6) is not damaged.

#### MECHANICAL SEAL (6)

This component is entirely self-adjusting in service and needs no maintenance.

Removal of the Rotor (4) will release the moving parts of the Mechanical Seal, undo the four nuts or set screws at the Motor/Body Flange and remove the bolts. The Body (5) may then be removed from the motor but care should be taken to ensure the static seat does not touch the shaft.

After removing the Body, the static seat may be removed by hand.

### PUMP (CP800) ASSEMBLY

#### MECHANICAL SEAL AND BODY

Carefully press static seat of Mechanical Seal (6) in Body (5) ensuring that the worked face is not marked or damaged and is exposed.

After installing Thrower (7) on Shaft pass Body over Shaft and engage body flange on Motor Flange Spigot and align all bolt holes. Enter bolts or set screws and screw on nuts ensuring that a flat washer is under head of bolt and between body and spring washers under nut. Tighten evenly.

Pass dynamic part of Mechanical Seal (6) over Rotor Head ensuring that spring is seated in retaining washer.

#### ROTOR, STATOR AND END COVER

Apply a small quantity of anti-seize compound on threads of motor shaft and screw on Rotor (4). Tighten until firm but do not over tighten.

#### Note:

- Tightening torques for "Rotor, Stator and End Cover" assembly can be found on page 10.
- Do not forget to remove filling plug (3) to fill pump with liquid prior to starting.

# Grifter Control Unit

## **10.0 SPECIFICATIONS GRIFTER CONTROL UNIT**

### **10.1 CONTROL DESCRIPTION**

The Unit has been designed to control either a single motor unit or a double motor unit with motors up to 0.75kw 3 phase or 0.75kw single phase, with either 24 volt A.C. or 110 volt A.C. control circuit as requested.

The unit is supplied as duty standby for control by either float switches or level controls.

The control unit has been constructed to use the most up to date components by using circuit breakers instead of fuses. Contactors and relays to BS5486 part 1 and I.E.E 439/1 and is completely contained within the Grifter Unit.

An additional Flashing Beacon or Alarm Buzzer can be supplied to indicate fault or high level alarm if required. It is the customers responsibility to ensure that the supply to the unit is correctly fused and earthed as required by I.E.E. and/or all local regulations.

### **BEFORE INSTALLATION**

**Always check with circuit diagram packed in panel of unit.**

Mono Pumps Ltd reserves the right to alter or modify circuits in accordance with developments of special market requirements codes etc.

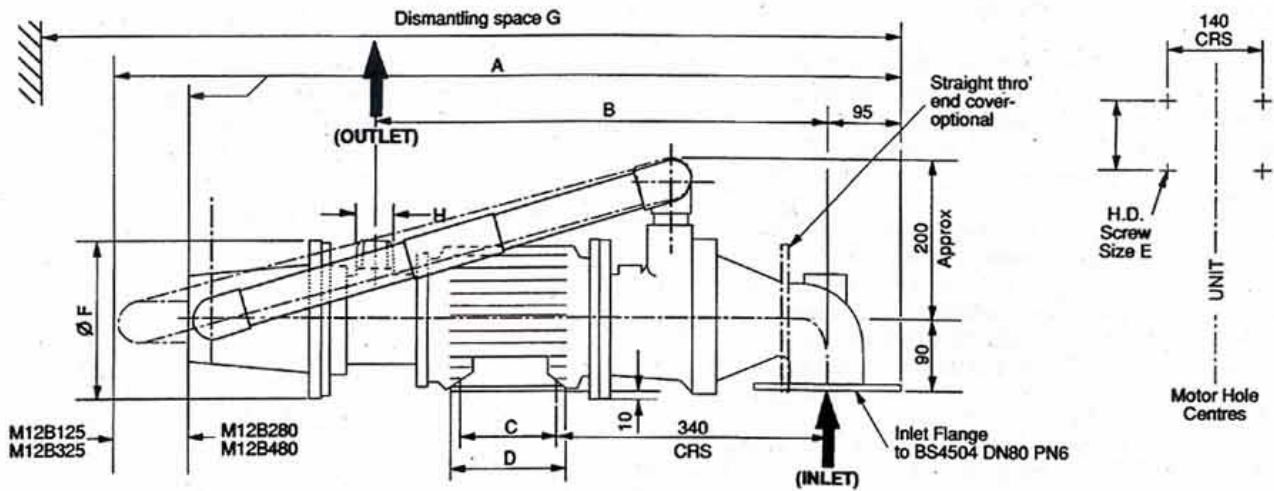
**For circuit diagrams & connections, refer to drawings supplied in the Control Panel.**

See appendix A & B for schematic & layout drawings.



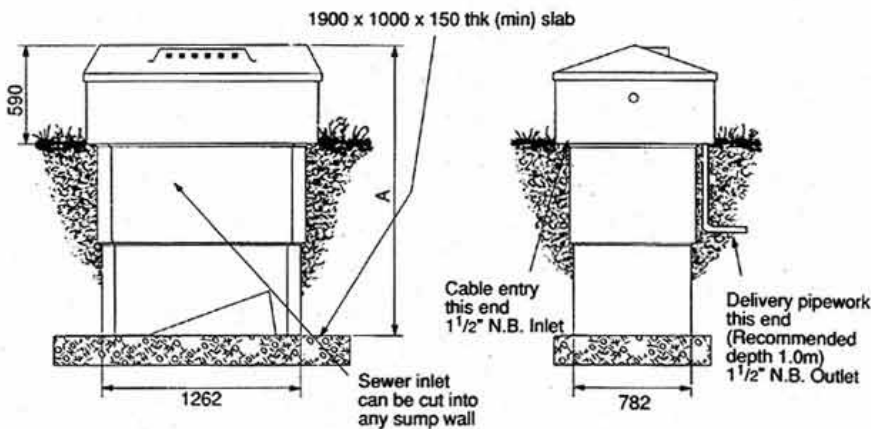
# Dimensions and Weights

## 11.1 GRIFTER ONLY

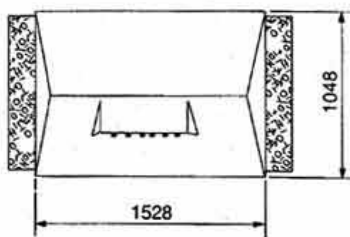


| Model              | kW   | A     | B   | C   | D   | E  | F   | G    | H             | WT (kgs) |
|--------------------|------|-------|-----|-----|-----|----|-----|------|---------------|----------|
| M12B125<br>M12B325 | 0.55 | 913.5 | 536 | 100 | 127 | M8 | 167 | 1075 | 1" BSP Female | 45       |
| M12B280            | 0.75 | 878.5 | 561 | 125 | 152 | M8 | 182 | 1040 | 1½" BSP       | 50       |

## 11.2 PACKAGE SYSTEM



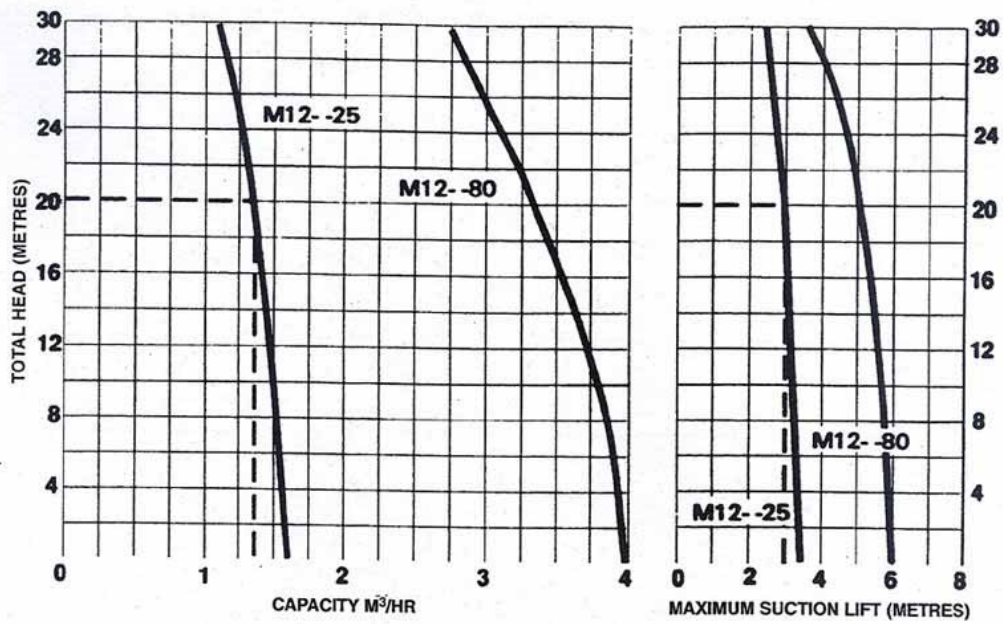
| Sump Depth | DimA | WT (kgs) |
|------------|------|----------|
| 1200       | 1790 | 270      |
| 1600       | 2190 | 350      |



For higher flows and heads please see our Mutrator and Munchpump leaflets. Our pump ranges cover most applications up to 325m<sup>3</sup>/hr. Maximum Head 24 Bar.

|   |  |
|---|--|
| Kiosk:  | 1528mm long x 1048mm wide x 590mm high   |
| Sump Depths:  | 1200mm or 1600mm standard. Other depths to special order.                                |
| Foundation Slab:  | 1900mm long x 1000mm wide x minimum 150mm thick (to suit local ground conditions)        |
| Pump Capacity: (Nominal)                                      | Model M12B125, M12B325 .43 litres / second<br>Model M12B280, M12B480 1.1 litres / second |
| Maximum Head:   | 3 Bar  |
| Discharge Connection to Rising Main:                          | 1½" BSP union  |
| Available for both single and three phase electrical supplies |  |

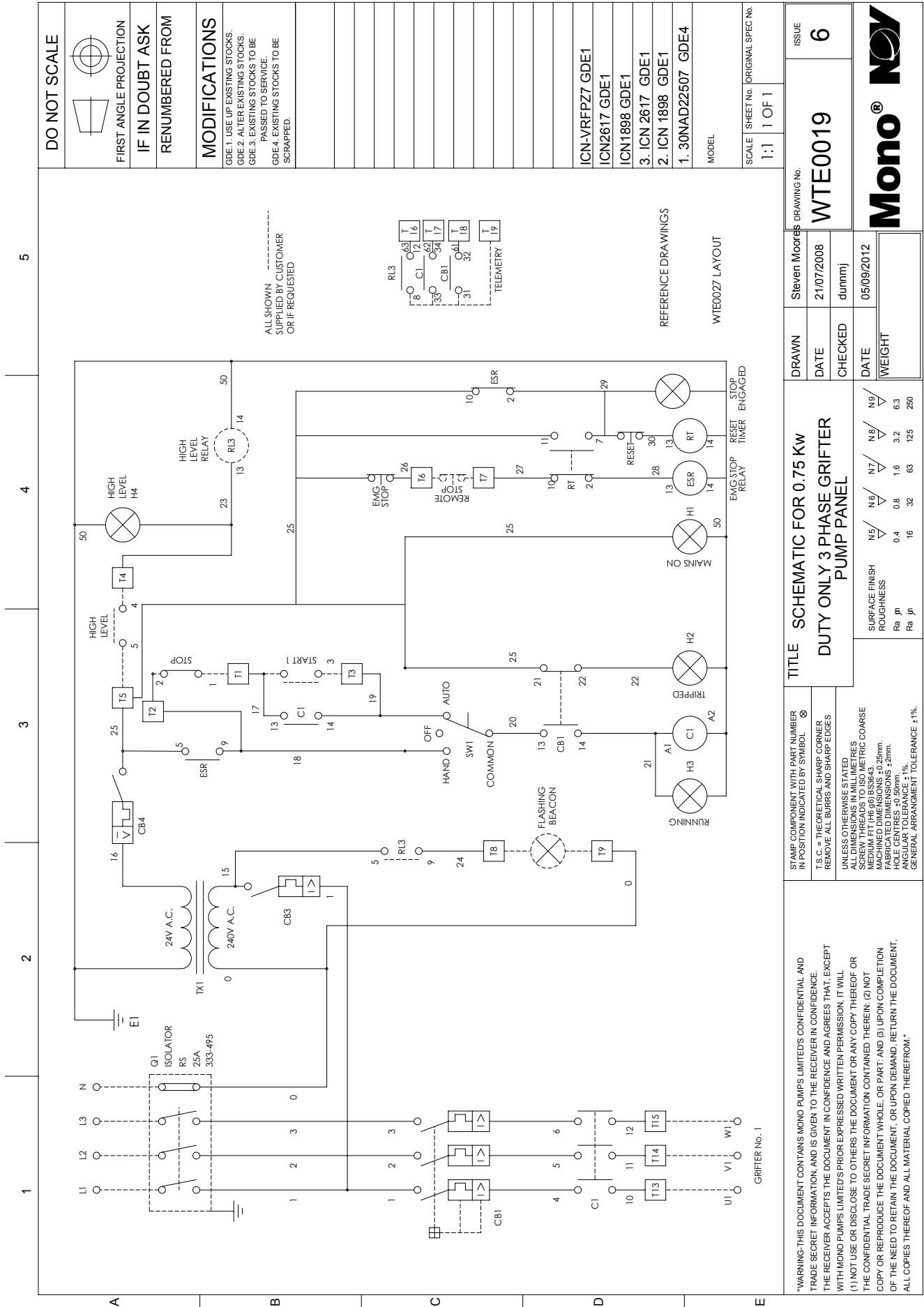
# Capacities and Suction Lifts



**EXAMPLE:** at a total Head of 20 metres, a M12B25 will give 1.43m<sup>3</sup>/hr Capacity with a maximum suction lift of 3.0 metres.



# Appendix A







[nov.com/industrial](https://www.nov.com/industrial)

© National Oilwell Varco - All rights reserved