MANU ELECTRONICS PTY LTD
FLOW CONTROL SYSTEMS ACN 002 746 303

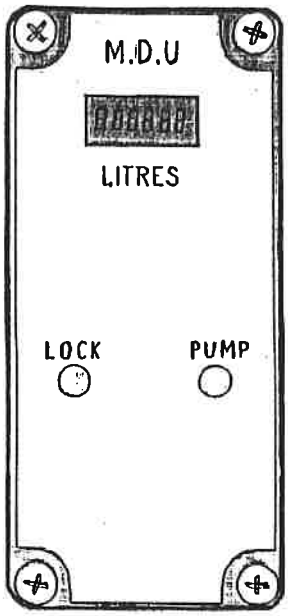
41 Carter Road Brookvale
Sydney NSW 2100 Australia
Tel: +61 2 99054324, 99381425
Fax: +61 2 99385852
Email: manu@ozemail.com.au

NDS - NUTRIENT DOSING SYSTEM

The Nutrient Dosing System (NDS), is a complete system designed for automatic dosing of liquid nutrient into livestock's drinking troughs. The overall design of the system has taken into consideration the requirements of both the Department of Primary Industries of N.T. and those of the farmers.

The complete NDS system comprises the following main components:-

MDU	-	Manu Dosing Unit
SP	-	Solar Panel
RB	-	Rechargeable Lead Battery
JP	-	Diaphragm Dosing Pump
RPFS-L	-	Rota Pulse Flow Sensor
BSP	-	1" BSP Adaptor nipple (or complete adaptor tee)
HB	-	Galvanized Housing Box



The Manu Dosing Unit (MDU) is the latest model incorporating safety lock out timer with dual relay, driving dosing pump. Housed in a new IP67 enclosure, the electronics are protected from the harshest environments.
The internal sensor calibration, litres quantity and dosing time selectors are easy to use and safely housed within the enclosure, preventing tampering.

GENERAL OPERATION

A paddlewheel type flow sensor (RPFS-L) turns when water is flowing, topping up trough. The spinning wheel sends pulses to the MDU dosing controller unit. Calibration is selected by selector switches marked CAL. with Tens & Units, the setting being dependant on pipe diameter used for water delivery. (see table.1.)
The divided pulses representing litres, are displayed in total litres of water, indicated on the 6 digit LCD display counter (with memory).
The time at which the dosing pump is to start, is dependant on the Litres select switches, marked LITRES with Tens & Units. Therefore by selecting from 1 upto 99 litres, will control when the pump will come on after so many litres of water have passed.
Now you choose how many seconds duration (from 1-10), the dose pump should stay on. This is done by the 10 way DIP switch, numbered from 1-10 (marked P.DOSE). Simply slide up dip switch to ON (only one at any time). Pump operation is indicated by LED (marked PUMP).
If by some chance the dosing pump did not stop at the chosen seconds, the safety lock out relay cuts off and stops pump after ≈ 12 seconds. Two LED's indicate operational safety status. Left LED (marked LOCK) is on when safety lockout has occurred. Right LED (marked PUMP) is on when pump operates as per normal.
To restart NDS system or reset safety lock out timer, interrupt 12VDC power or switch off for 10 seconds. Then turn on or reconnect power, NDS system is ready again.
(Note: If in doubt do not persist, replace unit or call Manu Electronics or Representative for advise).

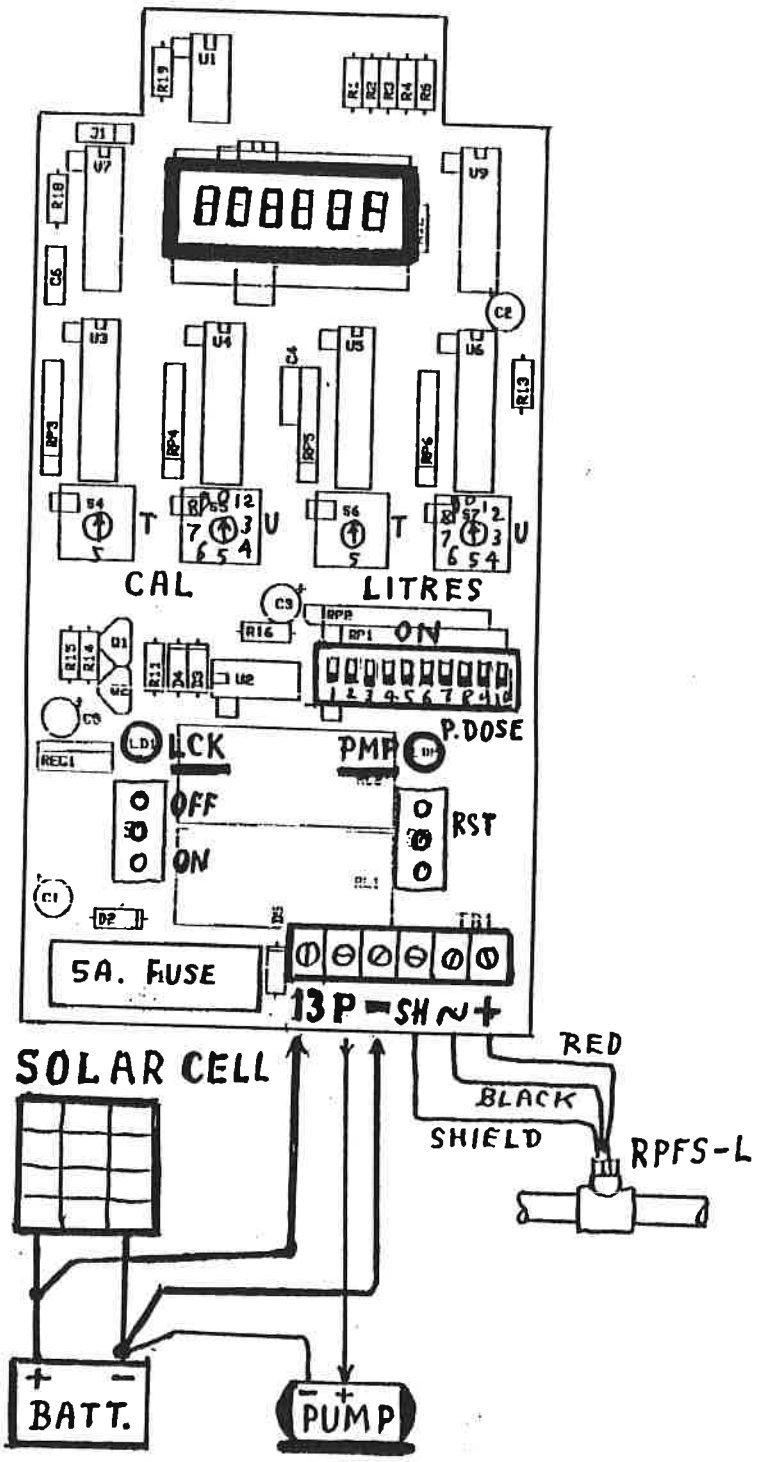
Table 1.

Pipe diameter	Calibration tens	units
25mm	8	0
40mm	3	0
50mm	2	0
80mm	0	8

MANU ELECTRONICS PTY LTD
FLOW CONTROL SYSTEMS ACN 002 746 303

SYSTEM SPECIFICATIONS

Manu Dosing Unit	-	12VDC 11 mA standing, starting relay + MDU 0.110 amps. Fuse 5 amps.
Rechargeable battery	-	12VDC 6.5 amp/hrs model: LCR12V6.5P (Panasonic)
Solar Panel	-	12VDC 5 watts model: BP1205
Pump	-	12VDC 1.8 amps. Johnson P75 or Fiama,diaphragm
Flow sensor	-	Rota pulse special low current model (RPFS-L)
BSP	-	Brass 1" adaptor nipple or optional complete GAL or PVC adaptor tee available in sizes 25,40,50 or 80mm Ø.
Metal housing box	-	Galvanized iron, dimensions 300 x 300 x 300 mm.
Weight	-	Complete system 9.8 kg.



Option -D1

Data-logger output pulse
1 pulse = 1 litre

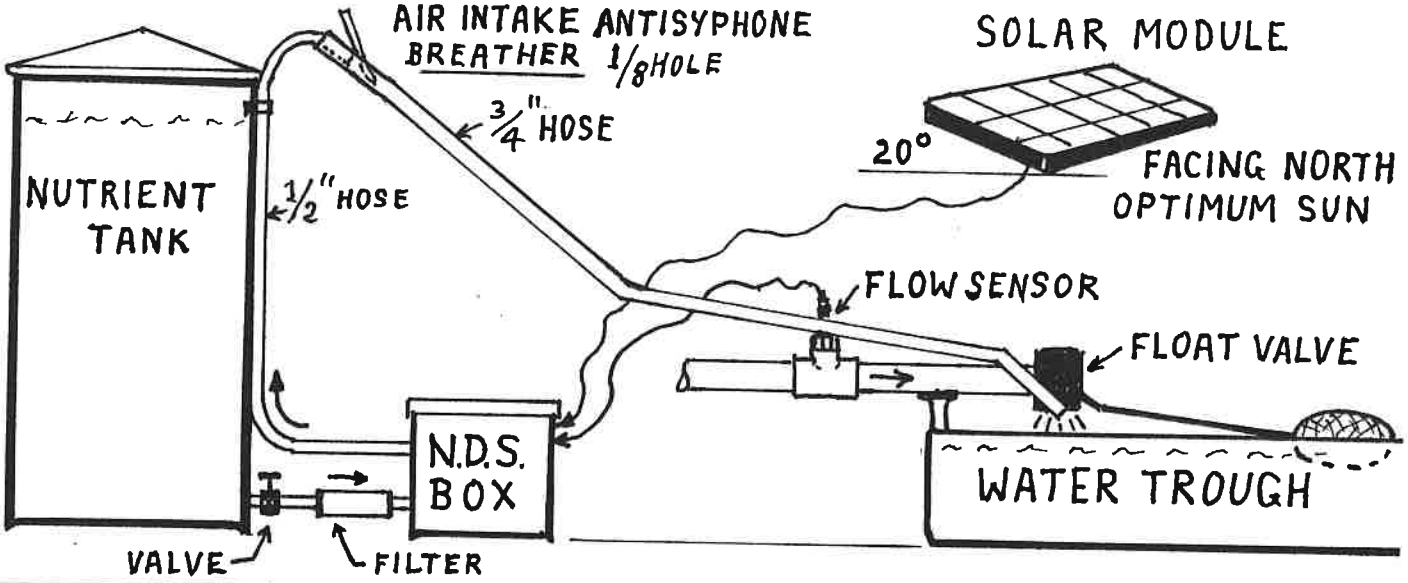
DT5-E maximum input pulse is 10Hz.

Via 2 pin plug/socket set.
Collector =C, Emitter=E

INSTALLATION

PUMP & GRAVITY NUTRIENT DISCHARGE SINGLE TROUGH SYSTEM

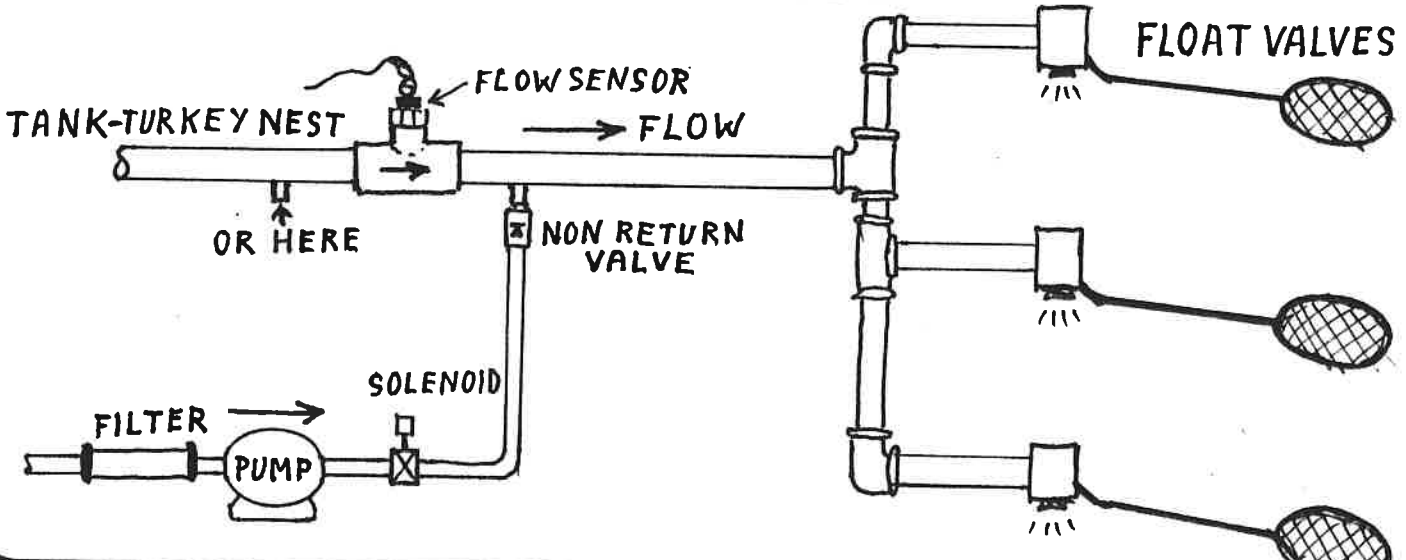
- First position nutrient tank near water flow line to trough.
- Find convienient site to place NDS housing box, avoiding flooding and level with nutrient tank.
- Mount solar panel facing 20° north. Avoiding shadowing on panel.
- Connect inline filter between nutrient tank and inlet to pump with ½ inch reinforced garden hose.
- Fron pump outlet connect ½ inch reinforced garden hose and run up above top liquid level of nutrient tank. Then fit breather tee and ¾ inch reinforced garden hose leading to water flow pipe outlet and float.
- As you fit ½" to ¾" hose, curve it and puncture a $\frac{1}{8}$" hole and place small air hose or copper pipe to prevent syphoning (by taking in air). This will achieve an important safety, preventing pump leakage or back filling of nutrient tank with water.



PUMPED IN LINE NUTRIENT DISCHARGE SINGLE OR MULTI TROUGH SYSTEM

By following drawing below , observe that nutrient can be pumped into water flow pipe line before or after flow sensor (RPFS-L).

Non return valve must not be spring loaded for it will inhibit dosing pump pressure, restricting nutrient supply.
A 12vdc 6watts solenoid valve will stop syphoning or leakage through pump. (solenoid should be fitted inside NDS housing box and parrallel with pump).
Line filter should be fitted to stop impurities blocking solenoid and or check valve.
Water is sourced from a tank or turkeys nest by gravity.
When using windmill or motor, you can install flow sensor before filling pipe.



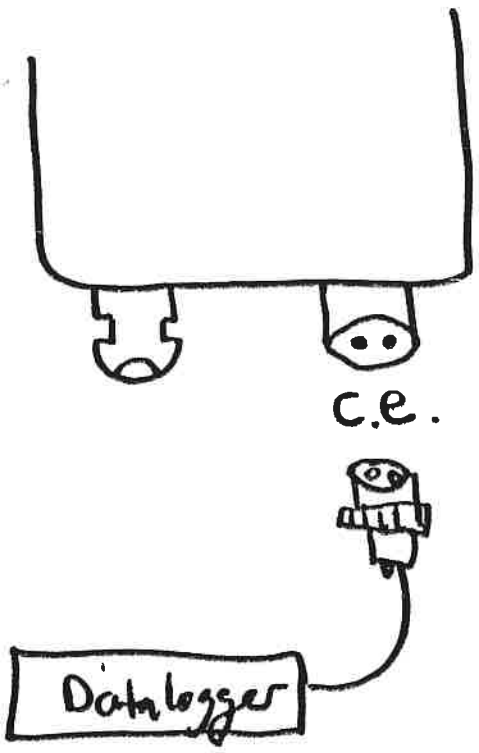
MANU ELECTRONICS PTY LTD
FLOW CONTROL SYSTEMS ACN 002 746 303

17/9/98.

MDU - D1

When ordering quote :-

D I = Datalogger output 1 Litre.



Pulse output is standard 1 Litre per pulse.

Note: Max. input speed is 10 Hz or Litres per second.

Ring: Datalogger Aust. Attn: Phil Van Laeren

02 9971 7994