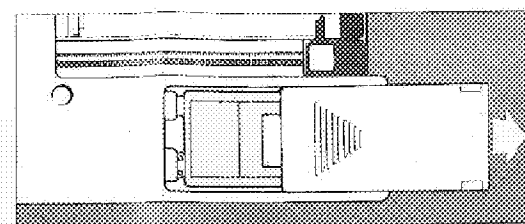


**GRASEBY**  
**MEDICAL**

# INSTRUCTIONS FOR THE USE OF AMBULATORY SYRINGE DRIVERS

## Syringe Driver Description



Syringe drivers are battery powered. They measure 166 x 53 x 23 mm and weigh 175 g.

The battery compartment is located in the back of the syringe driver and is accessed via a removable sliding battery cover.

A serial number unique to each syringe driver is marked in this compartment. Correct insertion of the battery is confirmed by an alarm which runs for several seconds. (Note that there is no alarm on the MS18 model)

A scale on the front of the syringe driver enables the fluid length to be measured. It runs from 0 - 60 mm (this is the maximum length a syringe plunger can be extended to and still fit on the syringe driver).

**GRASEBY SYRINGE DRIVERS ARE NOT WATERPROOF! IF ONE GETS WET - REMOVE FROM SERVICE IMMEDIATELY AND HAVE IT CHECKED BY A QUALIFIED ELECTRONICS ENGINEER (MAKE SURE YOU PASS ON THE INFORMATION TO THE ENGINEER THAT THE DEVICE HAS BECOME WET).**

### STARTING THE SYRINGE DRIVER

Insert a battery and listen for the alarm, (not on the MS 18). Press and hold down the start/test button (start/boost on the MS 26). The motor will run for several seconds and then stop. (This confirms that the motor safety circuits are operating).

Release the start/test (start/boost) button. The syringe driver is now running.

The indicator light will now be flashing.

Do not proceed if the syringe driver fails any of these tests, but refer to qualified engineer.

### INDICATOR LIGHT

This light confirms that there is sufficient power in the battery to complete the infusion. If it stops flashing whilst the syringe driver is running, the infusion will still be completed. The battery should then be changed.

### BATTERIES

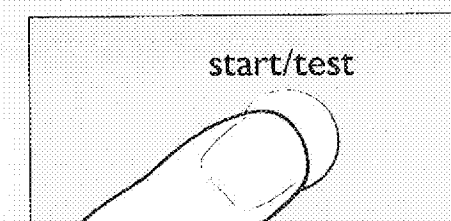
Always use a 9v alkaline battery. A fresh battery should last 50 days. Remove the battery when the unit is not in continuous use.

Changing: Slide the battery compartment cover to remove. Turn the syringe driver upside down and let the battery fall into the hand. Replace it with a fresh alkaline battery. Replace cover.

### ALARMS (not fitted to MS18)

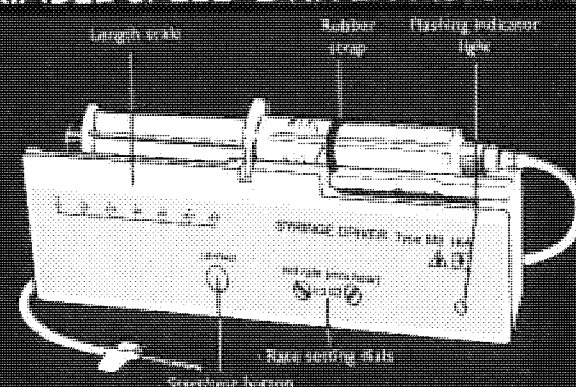
All audible alarms will sound for approx 10-15 seconds duration. The following conditions will cause an audible alarm.

1. Immediately after insertion of a battery.
2. Holding down the start button.
3. Actuator at the end of its travel, ie, empty syringe.



**!! ALWAYS REMEMBER THAT GRASEBY AMBULATORY SYRINGE DRIVERS ARE USED TO DELIVER MILLIMETRES OF TRAVEL, NOT MILLILITRES!!**

### VARIABLE SPEED DRIVER MSI6 MM/HR



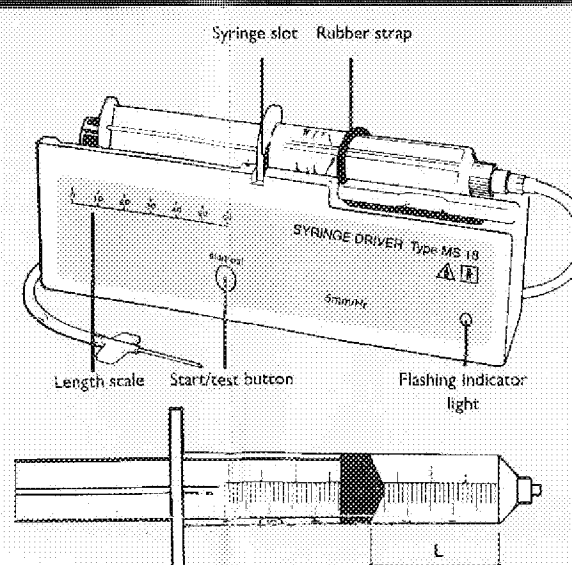
USED FOR INFUSIONS FROM 20 MINUTES TO 24 HOURS.

CALCULATING THE RATE SETTING FOR A 24 HOUR INFUSION (EXAMPLE):

- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 48 mm.

- There is a measuring scale on the syringe driver for this.

### FIXED SPEED DRIVER MS18 5 MM/HR



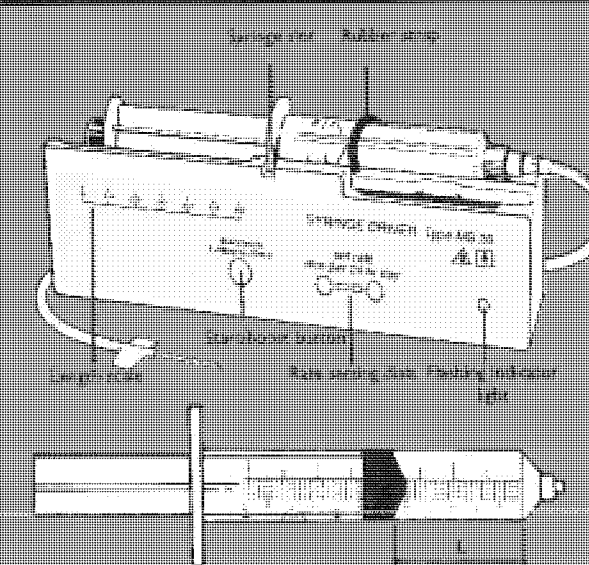
USED FOR INFUSIONS UP TO 12 HOURS.

CALCULATING THE TIME TO COMPLETE INFUSION (EXAMPLE):

- Draw up the medication into a syringe and add diluent until the length of fluid in the syringe measures 50 mm.

- There is a measuring scale on the syringe driver for this. Divide the fluid length (50 mm) by the speed of the pump.

### VARIABLE SPEED DRIVER MS26 MM/DAY



USED FOR INFUSIONS OF 24 HOURS OR LONGER.

CALCULATING THE RATE FOR A 24 HOUR INFUSION (EXAMPLE):

- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 50 mm.

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USED FOR INFUSIONS FROM 30 MINUTES TO 24 HOURS.

## CALCULATING THE RATE SETTING FOR A 24 HOUR INFUSION (EXAMPLE)

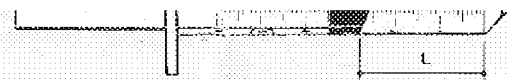
- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 48 mm.
- There is a measuring scale on the syringe driver for this. For most 10 ml syringes the volume of fluid in the syringe will be 10 ml.
- Divide the fluid length (48 mm) by the infusion period (24 hrs).  
ie.  $\frac{48}{24} = 2$
- Using the rate adjusting key, set the rate dials as shown below.
- Set rate (mm/hr) 02
- Every hour the plunger will advance 2 mm and 24 hours later the syringe will have been emptied.



USED FOR INFUSIONS UP TO 12 HOURS.

## CALCULATING THE TIME TO COMPLETE INFUSION (EXAMPLE)

- Draw up the medication into a syringe and add diluent until the length of fluid in the syringe measures 50 mm.
- There is a measuring scale on the syringe driver for this. Divide the fluid length (50 mm) by the speed of the pump 5 mm/hr.  
ie.  $\frac{50}{5} = 10$  hours
- Therefore the infusion in this case will last for 10 hours.



USED FOR INFUSIONS OF 24 HOURS OR LONGER.

## CALCULATING THE RATE FOR A 24 HOUR INFUSION (EXAMPLE)

- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 50 mm.
- There is a measuring scale on the syringe driver for this.
- For most 10 ml syringes, the volume of fluid in the syringe will be approx 10 ml. Divide the fluid length (50 mm) by the infusion period (1 day).  
ie.  $\frac{50}{24} = 2.08$ . Use the rate adjust key.
- Set the rate as shown below.
- Set rate (50 mm per 24 hour day).
- So every day the plunger is being advanced 50 mm thus emptying the syringe.



## THE DIFFERENCE BETWEEN THE MS16A AND MS26

	MS16A	MS26
Colour	BLUE	GREEN
Rate Settings	1-99 mm/hr	1-99 mm/day
Boost Facility	No	Yes (0.23 mm)
Indicator Light Frequency	1 Second	26 Seconds

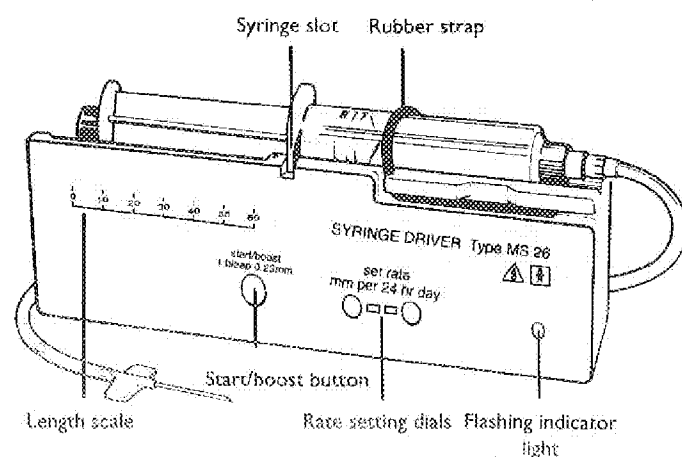
## BOOST FACILITY – MS26 ONLY

This allows a small accurate bolus of medication to be delivered.

The plunger is advanced by 0.23 mm with each boost. Four boosts is approx 1 mm of travel.

Note: For every mm the plunger is advanced using the boost facility, the total infusion time will be shortened by:

$\frac{1}{24} \times 24 \text{ hours} = 10 \text{ minutes (approx) assuming a full typical 10ml syringe}$



## ADDITIONAL POINTS

The rate dials are flush fitting to prevent accidental alteration to the infusion rate.

The syringe sits on a shallow v-shaped recess on top of the syringe driver. The flange of the syringe fits onto the main slot as shown in the diagram.

The actuator advances the plunger by moving along the lead screw. It can be moved backwards and forwards by pressing the white button.

A neoprene strap also secures the syringe in position.

To start the syringe driver press and release the start/test button.

There is no off switch on the syringe driver. This is to prevent accidental switch off when the unit is in use. It will switch itself off at the end of travel (of the actuator).

IN CASE OF QUESTIONS ON USE OF THE SYRINGE DRIVERS  
YOUR LOCAL CONTACT IS .....Graseby Medical Ltd., Colonial Way, Watford, Hertfordshire, WD2 4LG, England  
Tel: (0923) 246434, Telex: 929263 GRAMED G, FAX: (0923) 231595.

!! ALWAYS REMEMBER THAT GRASEBY AMBULATORY SYRINGE DRIVERS ARE USED TO DELIVER MILLIMETRES OF TRAVEL, NOT MILLILITRES!!

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DRAWING OFFICE		
GRASEBY MEDICAL LIMITED		

**GRASEBY**  
**MEDICAL**

**INSTRUCTIONS  
FOR THE USE OF  
AMBULATORY  
SYRINGE DRIVERS**

# AMBULATORY SYRINGE DRIVERS

measured. It runs from 0 - 60 mm (this is the maximum length a syringe plunger can be extended to and still fit on the syringe driver). GRASEBY SYRINGE DRIVERS ARE NOT WATERPROOF! IF ONE GETS WET - REMOVE FROM SERVICE IMMEDIATELY AND HAVE IT CHECKED BY A QUALIFIED ELECTRONICS ENGINEER (MAKE SURE YOU PASS ON THE INFORMATION TO THE ENGINEER THAT THE DEVICE HAS BECOME WET).

## STARTING THE SYRINGE DRIVER

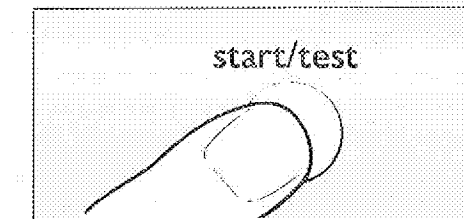
Insert a battery and listen for the alarm. (not on the MS 18). Press and hold down the start/test button (start/boost on the MS 26). The motor will run for several seconds and then stop. (This confirms that the motor safety circuits are operating).

Release the start/test (start/boost) button. The syringe driver is now running.

The indicator light will now be flashing.

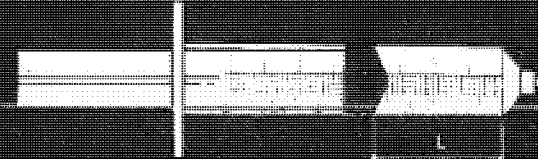
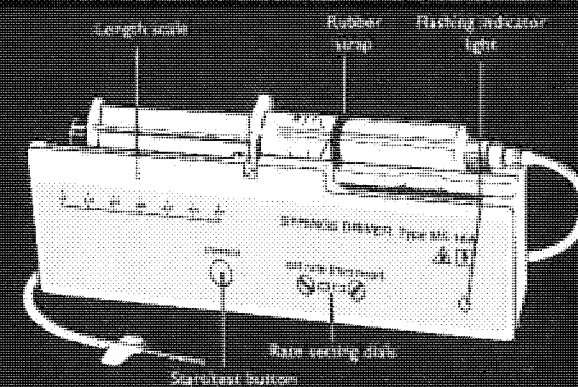
The following conditions will cause an audible alarm:

1. Immediately after insertion of a battery.
2. Holding down the start button.
3. Actuator at the end of its travel, i.e. empty syringe.



**!! ALWAYS REMEMBER THAT GRASEBY AMBULATORY SYRINGE DRIVERS ARE USED TO DELIVER MILLIMETRES OF TRAVEL, NOT MILLILITRES!!**

## VARIABLE SPEED DRIVER MS16 MM/HR



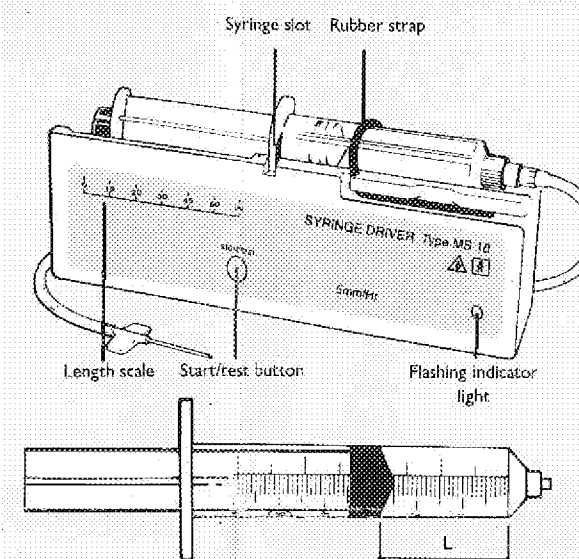
USED FOR INFUSIONS FROM 20 MINUTES TO 24 HOURS.

CALCULATING THE RATE SETTING FOR A 24 HOUR INFUSION (EXAMPLE):

- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 48 mm.
- There is a measuring scale on the syringe driver for this. For most 10 ml syringes the volume of fluid in the syringe will be 10 mls.
- Divide the fluid length (48 mm) by the infusion period (24 hrs).  
ie.  $\frac{48}{24} = 2$
- Using the rate adjusting key, set the rate dial as shown below.
- Set rate (mm/hr) 02
- Every hour the plunger will advance 2 mm and 24 hours later the syringe will have been emptied.



## FIXED SPEED DRIVER MS18 5 MM/HR

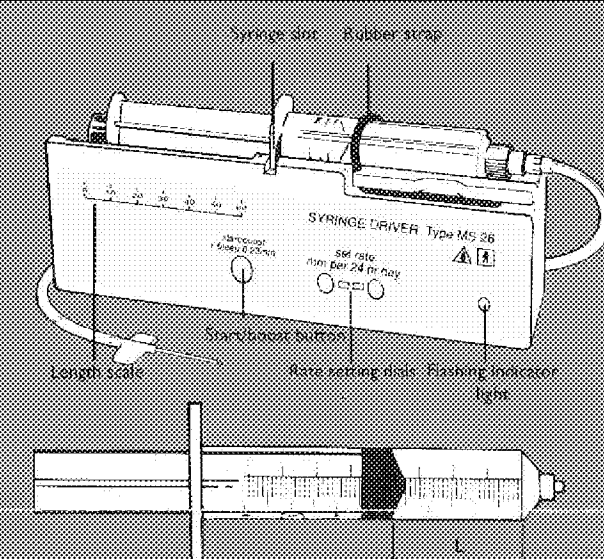


USED FOR INFUSIONS UP TO 12 HOURS.

CALCULATING THE TIME TO COMPLETE INFUSION (EXAMPLE):

- Draw up the medication into a syringe and add diluent until the length of fluid in the syringe measures 50 mm.
- There is a measuring scale on the syringe driver for this. Divide the fluid length (50 mm) by the speed of the pump 5 mm/hr.  
ie.  $\frac{50}{5} = 10$  hours
- Therefore the infusion in this case will last for 10 hours.

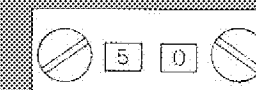
## VARIABLE SPEED DRIVER MS26 MM/DAY



USED FOR INFUSIONS OF 24 HOURS OR LONGER.

CALCULATING THE RATE FOR A 24 HOUR INFUSION (EXAMPLE):

- Draw up the medication in a syringe and add diluent until the length of fluid in the syringe measures 50 mm.
- There is a measuring scale on the syringe driver for this.
- For most 10 ml syringes, the volume of fluid in the syringe will be approx. 10 mls. Divide the fluid length (50 mm) by the infusion period (1 day).  
ie.  $\frac{50}{1} = 50$ . Use the rate adjust key.
- Set the rate as shown below.
- Set rate (50 mm per 24 hour day).
- So every day the plunger is being advanced 50 mm thus emptying the syringe.



## THE DIFFERENCE BETWEEN THE MS16A AND MS26

	MS16A	MS26
Colour	BLUE	GREEN
Rate Settings	1.99 mm/hr	1.99 mm/day

## BOOST FACILITY - MS26 ONLY

This allows a small accurate bolus of medication to be delivered.

The plunger is advanced by 0.24 mm with each boost. Each boost is approx. 1 mm of travel.