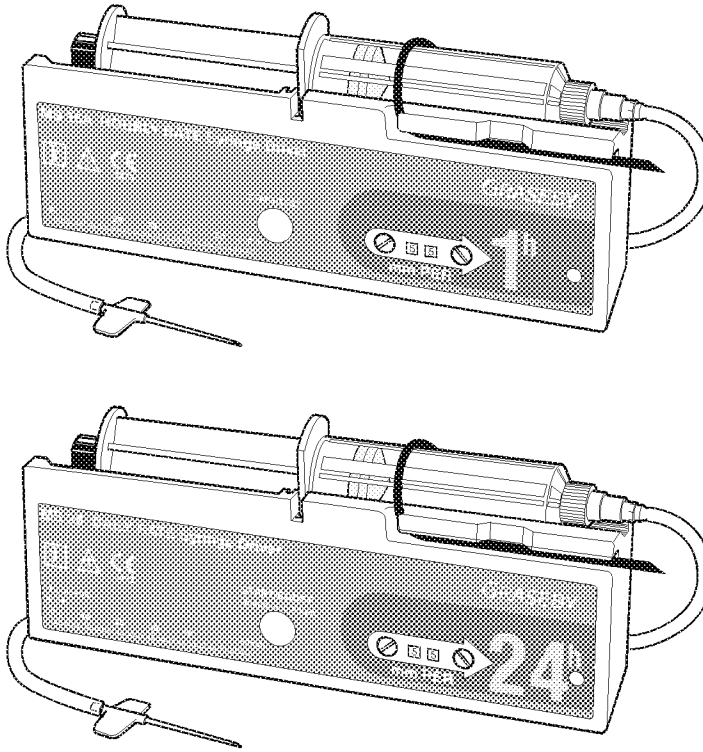
GRASEBY

# MS 16A Syringe Driver
# MS 26 Syringe Driver



## Instruction Manual

Please make sure the Instruction Manual is given to the person who will be responsible for using the Syringe Driver.

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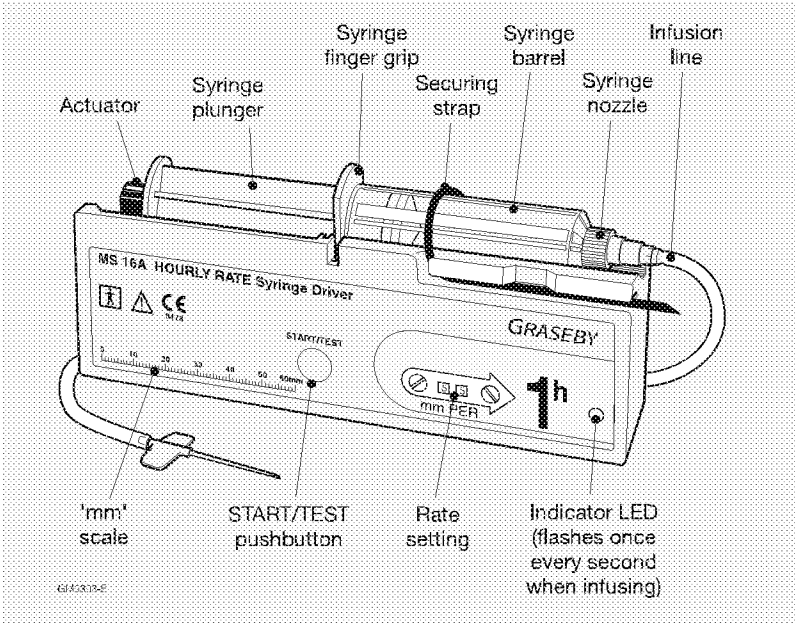
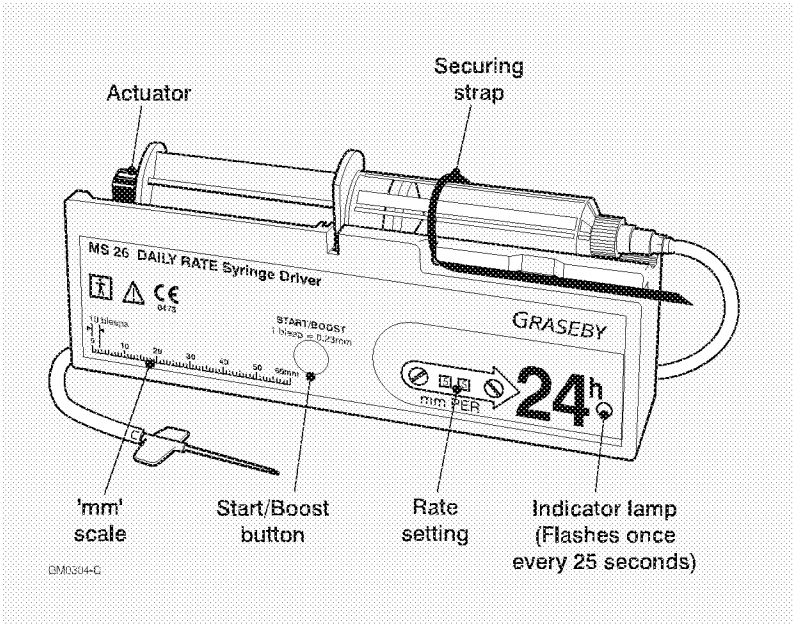



# The MS 16A HOURLY RATE Syringe Driver




# The MS 26 DAILY RATE Syringe Driver

# 1 Instructions - for the MS 16A and MS 26 Syringe Drivers

## Introduction

In this manual you will find instructions on how to use the Syringe Driver safely, care for it and what to do if it should go wrong. Please take time to read all the information before you start to use the Syringe Driver and follow all the warnings printed in bold type.

The Syringe Driver is a medical device and has been carefully designed and made to achieve a high level of safety protection. In making a decision whether the Syringe Driver is a suitable aid for a particular treatment the performance specification should be considered. Used wrongly this medical device can pose a serious risk to human life. It should therefore only be used under the supervision of a medical professional.

Please make sure the Instruction Manual is given to the person who will be responsible for using the Syringe Driver.

## What is a Syringe Driver?

A syringe driver is a power driven device for pushing the plunger of a syringe forward at an accurately controlled rate. It is an aid in administering medicinal preparations in liquid form over much longer periods than could be achieved by injecting by hand.

Besides the syringe driver all that is usually required is a suitable sterile syringe along with a sterile pathway to deliver the medication to the patient.

The MS 16A and MS 26 are battery powered ambulatory syringe drivers, so they can be carried around by patients whilst they are undergoing treatment.

These Syringe Drivers are suitable for administering medication intravenously (IV) or subcutaneously. For more information on subcutaneous infusion therapy see the section **Guide to subcutaneous analgesia.**

# What are the differences between an MS 16A and an MS 26?

It is most important to be familiar with what the differences are. The most visible difference is the colour; the **MS 16A** has a **blue** label and the **MS 26** a **green** one. The table shows all the main differences:

| Feature | MS 16A HOURLY RATE Syringe Driver | MS 26 DAILY RATE Syringe Driver |
|---|---|---|
| Rate range | 0 - 99 mm per hour | 0 - 99 mm per 24 hours |
| Indicator lamp flashes every | 1 second | 25 seconds |
| Motor turns every | (420 ÷ rate set) seconds | (168 ÷ rate set) minutes |
| Test time | 5 seconds | 10 seconds |
| Boost | NO | YES |
| Label colour | Blue | Green |

# Why are there two models?

The **MS 16A** is intended for administrations lasting between 30 minutes and 24 hours. The rate setting is in millimetres (mm) of syringe plunger movement every hour. The **MS 16A** is known as the **HOURLY RATE** Syringe Driver.

For slower infusions, the **MS 26** is intended for administrations over periods of 1 day and longer. The rate setting is in millimetres (mm) of syringe plunger movement every 24 hours. The **MS 26** is known as the **DAILY RATE** Syringe Driver. At the slowest setting, of 01, the **MS 26** would take 60 days to move the actuator over the full length of travel. The **MS 26** can also be used to give manually administered boost doses during the administration.

# How to use the Syringe Driver

## Do's and Don'ts

DO - check the battery daily.

DO - avoid using mobile telephones close, nearer than 1 metre, to the Syringe Driver. Although there have been no confirmed reports of mobile telephones interfering with the operation of the Syringe Driver, following this advice will help reduce any risk.

DON'T - use the Syringe Driver without understanding these instructions.

DON'T - get it wet. It is not waterproof and the performance will be affected.

DON'T - take it from a cool place and put it into a warm, very humid one (e.g. an incubator) or take it from there into a cooler one. Condensation will form and the inside will get wet.

DON'T - open it up to look inside. The performance will be affected.

DON'T - use it in or near strong magnetic fields, Nuclear Magnetic Resonance (NMR) scanners for example. They may stop it.

DON'T - use it in the presence of flammable anaesthetic gases or in an oxygen enriched atmosphere. It may increase the risk of a fire or explosion.

DON'T - use it outside its temperature range. The performance will be affected.

DON'T - wipe it with organic cleaning solvents or strong disinfectants. The plastic case may be damaged.

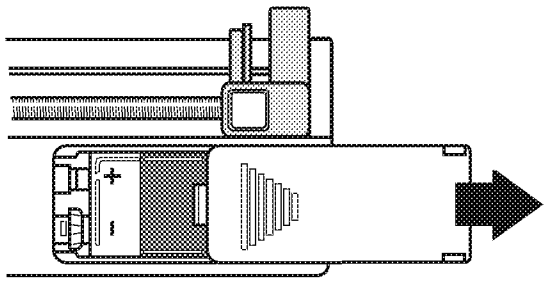
## Fitting the battery

Always fit a 9 volt (9 V) 'alkaline' battery. These batteries can be identified by the international code 6LR61 marked on them or on their packaging. They are available from most retail outlets selling batteries. A recommended battery of this type is the DURACELL MN1604.

Be careful when selecting a battery as some brands may not fit properly, if possible try the battery in the battery compartment first. Never try to force in a battery which is too large as this may damage the battery contacts.

Batteries of the 'zinc-carbon' type (marked 6F22 or 6R61), for example a PP3, are not recommended. They perform poorly with the Syringe Driver needing to be replaced more often.

To fit the battery, slide off the cover at the back of the Syringe Driver and push the battery in. The label in the battery compartment shows which way round to put it. Accidentally putting it in the wrong way round will not do any harm. Slide the cover on again until it latches shut.



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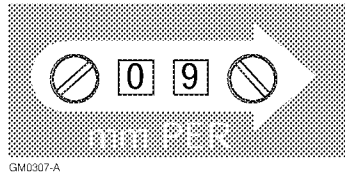
The alarm will sound for about 15 seconds after the battery is fitted.

# What the controls do

## Rate setting switches

These are the two switches that set the rate (speed) at which the syringe plunger will be pushed forwards. This is the distance, in mm, that the plunger will move in one hour on an **MS 16A** and in one day on an **MS 26**. There is one switch for the 'tens' and one for the 'units' of the rate value. Values from 0 to 99 can be set.



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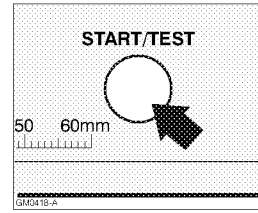
The numbers set appear in the windows next to each switch. The switches can be turned with the key supplied or with a small screwdriver with a flat blade.

## START/TEST button (MS 16A)

Pressing and holding this button down tests the safety system. Releasing it starts the MS 16A.



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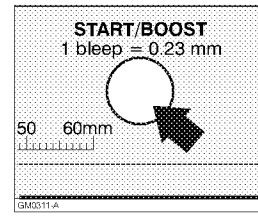
## START/BOOST button (MS 26)

Pressing and holding this button down tests the safety system and allows a boost dose to be administered by counting the sound bleeps. Releasing it starts the MS 26.



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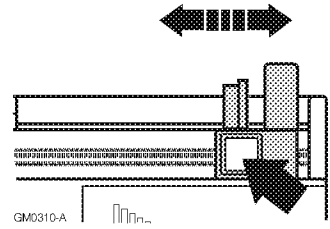
## Actuator release button

Pressing and holding this button down releases the actuator so it can be moved backwards or forwards by hand.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## What the symbols on the Syringe Driver mean

An electrical safety classification in the international safety standard for medical electrical equipment, Type BF. If the equipment is used as intended there is no risk of a serious electric shock. But it is not suitable for direct connection to the heart.

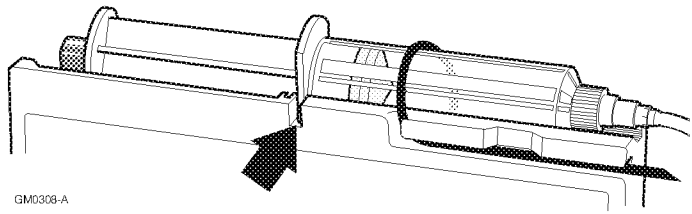
Refer to the accompanying instructions on how to use the equipment. The instructions are all in this manual.

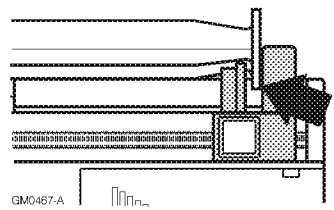

The CE mark demonstrates that the Syringe Driver conforms to the requirements in the European Council Directive 93/42/EEC concerning medical devices. The number 0473 identifies the Notified Body under which the Quality Systems operated within Graseby Medical Ltd. are assessed.

## Selecting a syringe

Most of the small sterile plastic syringes available, from 2 ml up to 35 ml capacity, can be used. Syringes with a Luer lock nozzle are best because they offer more security against accidental disconnection of the infusion line.

Choose a syringe brand and size that fits properly onto the Syringe Driver. The adjustable strap must fit round it to hold it firmly, the finger grip and the plunger push-button must fit in the retaining slots in the case and actuator.




With some of the larger sizes it may not be possible to fill them to their full capacity but they can still be used as long as they fit on properly.

## Identifying the Syringe Driver model, MS 16A or MS 26

The MS 16A is the HOURLY RATE model with the rate in mm per 1 h and has a BLUE label.

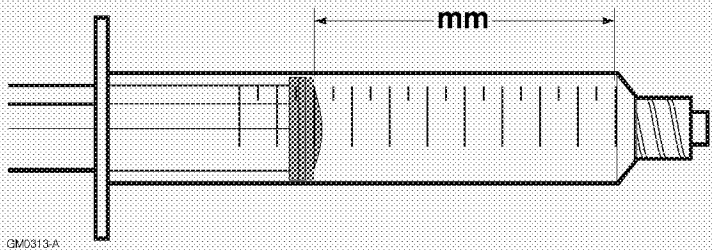
The MS 26 is the DAILY RATE model with the rate in mm per 24 h and has a GREEN label.

## Setting the correct rate for the MS 16A

1. Fill the syringe with the required volume of medication.

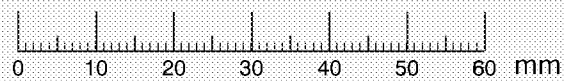
2. Connect and fill the infusion line. Make sure the connection is secure and the air is expelled.

3. Measure the distance, in millimetres (mm), from the empty (0) line on the syringe's scale up to the line where the plunger piston is. There is a 'mm' scale on the front of the MS 16A for this.




4. Divide this distance, measured in mm, by the time in hours (h) all the medication in the syringe needs to be administered in. The answer is the rate to set in the rate windows.

   Distance in mm ÷ Time in hours = Rate in mm per 1 h

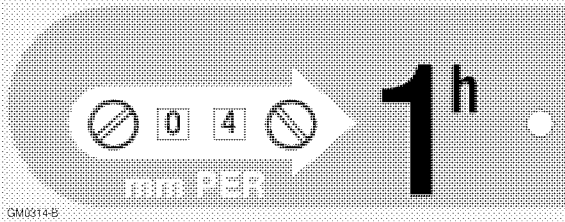


Here is an example:

A syringe is to be used to administer 8 ml of medication over 12 hours. With this syringe filled to the 8 ml line the plunger travel measures 48 mm.

48 mm ÷ 12 hours = 4 mm per 1 h

Set the rate switches to **04**




Each switch must be moved until all of the number can be seen in the window.

In this example, every hour the syringe plunger will move forwards 4 mm, administering about 0.67 ml of the medication and after 12 hours the syringe will have emptied.

Remember that for rates up to 9 the left-hand 'tens' number must be set at **0**.

If the result of the division is not a whole number select the nearest whole number for the rate.

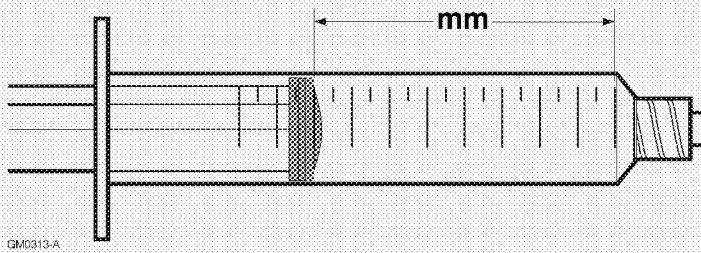
**REMEMBER THAT YOU HAVE TO SET THE RATE IN MILLIMETRES (mm) NOT MILLILITRES (ml).**

## Setting the correct rate for the MS 26

1. Fill the syringe with the required volume of medication.

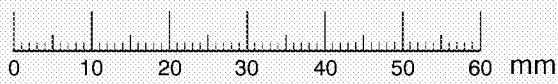
2. Connect and fill the infusion line. Make sure the connection is secure and the air is expelled.

3. Measure the distance, in millimetres (mm), from the empty (0) line on the syringe's scale up to the line where the plunger piston is. There is a 'mm' scale on the front of the MS 26 for this.




4. Divide this distance, measured in mm, by the time in days (24 hour (h) periods) all the medication in the syringe needs to be administered in. The answer is the rate to set in the rate windows.

   Distance in mm ÷ Time in days = Rate in mm per 24 h

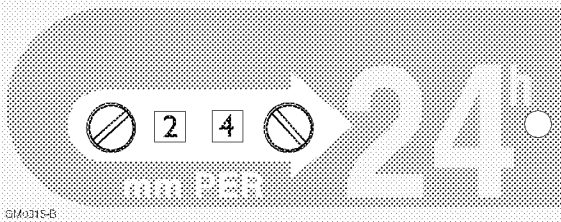


Here is an example:

A syringe is to be used to administer 8 ml of medication over 2 days. With this syringe filled to the 8 ml line the plunger travel measures 48 mm.

48 mm ÷ 2 days = 24 mm per 24 h

Set the rate switches to **24**




Each switch must be moved until all of the number can be seen in the window.

In this example, every 24 hours the syringe plunger will move forwards 24 mm, administering about 4 ml of the medication and after 48 hours the syringe will have emptied.

Remember that for rates up to 9 the left-hand 'tens' number must be set at **0**.

If the result of the division is not a whole number select the nearest whole number for the rate.

**REMEMBER THAT YOU HAVE TO SET THE RATE IN MILLIMETRES (mm) NOT MILLILITRES (ml).**

## Notes on setting up your Syringe Drivers

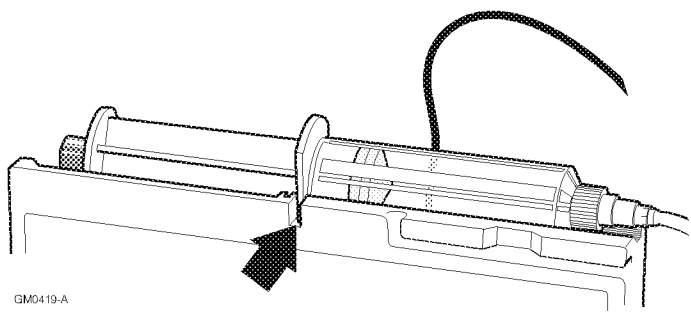
An alternative method may be used to set up the MS16A or MS26 Syringe Driver, if a specific policy has been devised as part of your hospital/community protocol.

The alternative method involves first measuring the volume in the syringe, then priming the line.

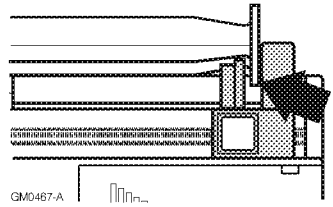
**Warning:** **If you measure first, then prime the line, the infusion will finish early.**
**You should therefore only use this method when your hospital has devised this protocol for a specific clinical area.**

## Fitting the syringe

1. Put the syringe on top of the Syringe Driver, with its barrel in the shallow V-shaped recess. The finger grip on the syringe barrel must be in the slot in the case.

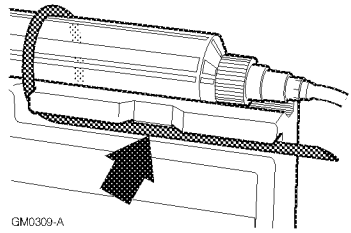


2. Move the actuator up to the syringe plunger, by pressing and holding in the button on the side, and sliding it along. The push-button on the plunger of the syringe must be fitted in the slot in the actuator. Be careful not to push the plunger forwards.




*Older versions did not have the slot in the actuator for the syringe plunger push-button. A small metal screw-clamp was supplied and this must be fitted through the hole in the actuator and used to hold the plunger push-button. The actuator can be replaced by the latest type and it is recommended that this is done the next time the Syringe Driver is overhauled.*

3. Put the rubber securing strap over the syringe barrel and pull it tight. Hook and then press it into the groove in the side of the case.



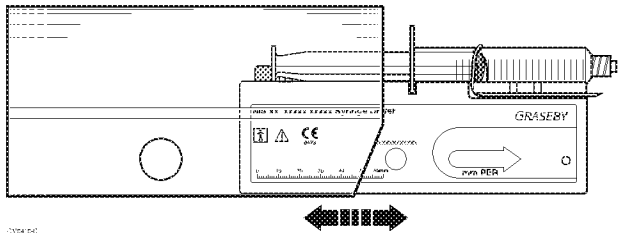

**WARNING: Risk of uncontrolled flow into the patient. Only use the Syringe Driver if the syringe can be secured as described.**

If the selected syringe does not fit, try another brand of syringe with the same capacity. Caution, the rate setting used may need to be changed so the dose is administered in the same time. Recalculate the correct rate to use.

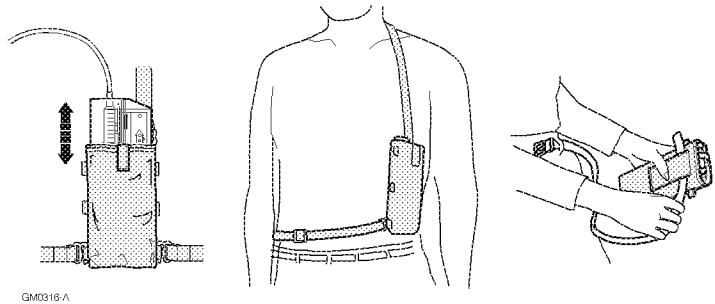
## Fitting the Cover

The clear Cover is supplied to protect the Syringe Driver with a syringe fitted. If the Syringe Driver is to be put in a holster then this Cover must be used.

1. Slide the Syringe Driver into one of the open ends of the Cover with the front facing the side of the Cover with the hole in it. NEVER PUT THE SYRINGE DRIVER IN FACING THE OTHER WAY.
2. Push the Syringe Driver in until the **START** button lines up with the hole. The peg on the inside back of the Cover goes into the hole in the middle of the back of the Syringe Driver. It is now held in the Cover.




3. The **START** button can be pressed through the hole in the Cover when needed.
4. If the Syringe Driver is to be carried then the Holster can be used. Keeping the syringe nozzle uppermost, slide the Syringe Driver with its Cover into the Holster. Fasten the tape across the top to hold everything in. Make sure the infusionline is not trapped anywhere.




5. To get the Syringe Driver out of the Cover, hold the Cover without squeezing it and press firmly on either end of the Syringe Driver until it pops out.

## Starting the Syringe Driver

Before starting the administration going through this checklist will help to make sure everything has been set up correctly:

- Correct Syringe Driver is being used. MS 16A or MS 26.
- Correct brand and size of syringe is fitted.
- Syringe is fitted securely.
- Syringe is filled with correct volume.
- Rate set is correct - check numbers showing in windows.
- Cover is fitted correctly (if needed).

Everything should now be ready to start. Always start the Syringe Driver like this to check the safety system and alarm are working.

1. Press and hold down the **START** button. The motor will turn and stop after:

   5 seconds for an **MS 16A** 10 seconds for an **MS 26**

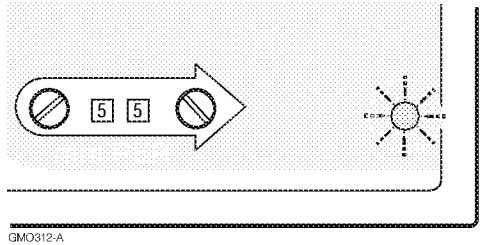
Then the alarm will sound. This will continue for about 15 seconds longer if the button is not released.

**WARNING: Do not use the Syringe Driver if the motor does not stop and/or the alarm does not sound. Refer to the section on servicing for advice on what to do if this happens.**

2. Releasing the button starts the Syringe Driver.
   The indicator lamp will begin to flash:

   once a second on the **MS 16A**

   once every 25 seconds on the **MS 26**

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Tip: If the lamp does not flash try replacing the battery.

**Caution:** The patient will receive a small amount of medication as the syringe plunger is pushed forwards during the safety check. If this is undesirable the final patient connection can be left until the **START** button has been released.

## During the administration

It is recommended that procedures are established for regular checks on the progress of the administration. Patients, relatives or other carers, as well as medical staff, should be made aware of a few simple checks that can be made.

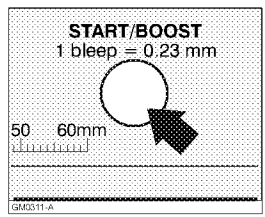
These are to confirm:

- the volume is being delivered as expected.
- the rate set is the correct value.
- the indicator lamp is flashing (the battery is not exhausted).
- the Syringe Driver is in good condition.

Also that they know what to do and who to contact in an emergency.

## How to use the Boost Dose on the MS 26

To administer a small boost dose (bolus) of medication the **START/ BOOST** button can be pressed and the number of bleeps of sound counted. With each bleep the syringe plunger moves forwards a controlled distance, each bleep is equivalent to 0.23 mm of plunger travel.




Here is an example:

The MS 26 has been set up to administer 50 mg of diamorphine over 24 hours. This has been made up in solution and the syringe filled up to 48 mm. The rate set is **48**.

For every mm the syringe plunger moves forwards the patient receives approximately 1 mg (50 mg ÷ 48 mm) of diamorphine.

If the **BOOST** button is pressed long enough for 4 bleeps to be counted the plunger will move 4 x 0.23 mm, administering about 1 mg of drug.

Remember that for every mm the plunger is moved forwards by using the **BOOST** button the time to complete the administration will be shortened, by in this example:

(1 ÷ 48) mm x 24 hours = 30 minutes

Tip: If boost doses are to be used allow extra volume in the syringe for these.

## Stopping the Syringe Driver

When the syringe is empty the Syringe Driver will stop automatically and the alarm will sound for about 15 seconds.

There is no OFF switch to stop the Syringe Driver before the syringe is empty. To stop it; move the rate switches to **00** - the indicator lamp will still flash, or take out the battery.

**WARNING: Risk of the remaining medication flowing out into the patient. Never take a syringe that is not empty off the Syringe Driver and leave it connected to the patient, unless the infusion line is clamped off.**

## Alarms

The Syringe Driver will give an audible alarm lasting about 15 seconds:

- when a battery is put in.
- when the **START/TEST** button on the **MS 16A** is pressed for longer than 5 seconds

  when the **START/BOOST** button on the **MS 26** is pressed for longer than 10 seconds.
- when the syringe is empty.
- when the Syringe Driver has stopped. This might be caused by a blocked or trapped infusion line.

The indicator lamp will stop flashing:

- when the Syringe Driver has stopped and switched off.
- when the battery needs replacing.

## Accessories

These accessories are supplied along with the Syringe Driver:

| | |
|---|---|
| Cover<br>0105-0529 | A clear rigid plastic cover to put over the Syringe Driver and syringe to protect them. |
| Holster<br>0105-0027 | A washable soft fabric holster for carrying the Syringe Driver (with Cover) whilst it is administering the medication. |
| Rate adjusting key<br>0113-0023 | Tool to turn the slotted rate switches. |

These are the optional accessories which can be ordered:

| | |
|---|---|
| Belt holster<br>0105-0082 | A leather holster for attaching to a belt as an alternative to the soft fabric type. The Cover still needs to be used with this holster. |
| Base<br>0105-0108 | This provides a secure base to stand the Syringe Driver on a flat surface. The Cover is not used with this accessory. |
| Instructions<br>0105-0549 | Extra copies of this manual can be ordered by quoting this number. |

# Care and Maintenance

When used as described in these instructions the Syringe Driver does not require any routine maintenance apart from replacing the battery and occasional cleaning.

It is recommended that the performance of the Syringe Driver is checked annually. If the Syringe Driver is damaged in any way the performance must always be checked before it is used again. See the section on servicing for further information.

## Battery replacement

Slide off the cover at the back of the Syringe Driver and gently tap out the battery. Always fit a fresh 9 volt (9 V) 'alkaline' battery of the correct type, IEC 6LR61. For example a DURACELL MN1604.

Slide the cover on, holding the battery down.

The alarm will sound for about 15 seconds after the battery is fitted.

## Cleaning

The outside surfaces can be cleaned by wiping them with a soft cloth either dampened with a solution of mild detergent or disinfectant, in water. The threads of the screw the actuator moves along can be cleaned with a small stiff bristled brush. A toothbrush is ideal.

Cleaning with organic solvents, e.g. surgical spirit, or abrasive cleaners, may damage some of the plastic parts.

**WARNING: Risk of change in device performance.**
**Never dip or immerse the Syringe Driver in any liquid or try to sterilize it with steam or gas. It is not completely sealed.**

## Storage

If you are going to store the Syringe Driver for some time, remove the battery; then put it in a warm dry place.

## Servicing

The Syringe Driver must be repaired by either Graseby Medical's service organisation, its appointed representatives or appropriately trained technicians who have access to the correct technical manuals, service bulletins and approved replacement parts.

**WARNING: Risk of change in device performance. Always use the appropriate parts and procedures for repair and testing as advised by Graseby Medical and published in its literature.**

For after-sales service or advice on how to use the Syringe Driver you can contact customer services at the address on the back-cover of the manual.

It will help to quote the Syringe Driver's serial number. This is on the label inside the battery compartment.

## Disposal

When the time comes to dispose of the Syringe Driver, accessories or packaging do so in the best way to minimise any negative impact on the environment.

You may be able to use special recycling or disposal schemes. To find out about these contact your local waste disposal service. Separate any parts of the equipment where arrangements can be made for their recovery, either by recycling or energy recovery.

**Important:** existing national or local regulations concerning waste disposal must take precedence over the above advice.

## Troubleshooting

If the Syringe Driver does not perform as expected, if it is dropped, gets wet or is damaged in any way, then remove it from use immediately. Mark it clearly as quarantined and preferably take it out of the working area altogether, so it cannot be accidentally used again, until it has been checked. Before it is used again, it must be carefully inspected for damage inside and its performance checked to the specification. The work must be done by a properly trained technician familiar with how these devices work.

**WARNING: Risk of change in device performance. If the Syringe Driver gets wet do not just dry the outside and then continue to use it. Liquid may have got inside and damaged it. Follow the advice given above.**

| Fault | Possible cause | Action |
|---|---|---|
| The Syringe Driver will not start. | The START button has not been pressed in enough. | Press again. |
| | There is no battery. | Fit a battery. |
| | The battery is in the wrong way round. | Refit battery. |
| | The battery is exhausted. | Fit a new battery. |
| | The Syringe Driver is faulty. | Service needed. |
| The infusion is going too quickly or has ended early. | Wrong rate set. | Correct error. |
| | Wrong syringe brand or size. | Correct error. |
| | Syringe plunger push-button or finger grips were not held in the actuator or case correctly. | Correct error. |
| | Plunger position measured wrongly. | Correct error. |
| | Line was filled after the plunger position was measured. | Correct error. |
| | MS 16A being used but the rate set was calculated for an MS 26. | Recalculate rate for MS16A. |
| | Boost button (on MS 26) has been used. | - |
| | Syringe Driver has got wet. | Remove from use immediately. |
| The infusion is going too slowly. | Wrong rate set. | Correct error. |
| | Wrong syringe brand or size. | Correct error. |
| | Plunger position measured wrongly. | Correct error. |
| The Syringe Driver has stopped before emptying the syringe. | Exhausted battery. | Fit a new battery. |
| | Blocked or trapped infusion line. | Clear line. |
| The Syringe Driver has stopped with the lamp still flashing. | The mechanism for pushing the plunger has worn out. Listen for a faint click when the motor turns a few times. | Service needed. |

# 2 Guide to subcutaneous analgesia

## Parenteral administration of drugs

### Indications

The main indications are the inability to swallow or absorb drugs. They may be due to:

- intestinal obstruction.
- mouth, throat and oesophageal lesions.
- persistent nausea and vomiting.
- weakness or unconsciousness.
- malabsorbtion.

Continuous subcutaneous infusion (CSI), where the drug is slowly infused under the skin, is a method of symptom control that can provide relief of multiple symptoms through one route. It has the following benefits over regular intramuscular injections:

- the variation in plasma concentration levels between injections is reduced.
- can reduce the cumulative amount of drug required.
- four hourly injections are avoided. These can be unpleasant and also may be difficult to arrange in the home.
- patient mobility is maintained.

### Converting from oral to parenteral administration

A loading dose equivalent to a four hourly dose can be given intramuscularly or subcutaneously as the syringe driver is started. This will avoid any lag period during which adequate blood levels are attained.

## Drugs commonly administered using syringe drivers

### (Opioid) Narcotic Analgesics

| | |
|---|---|
| diamorphine | analgesic used because of its higher solubility in water |
| fentanyl | |
| morphine | in the form of the sulphate or hydrochloride |

### Anti-emetics, antinauseants and antipsychotics

| | |
|---|---|
| cyclizine | antinauseant and antihistamine |
| droperidol | antinauseant and alternative to haloperidol |
| haloperidol | antinauseant, antipsychotic and anxiolytic |
| hyoscine | antinauseant, antispasmodic and dries bronchial secretions |
| methotrimeprazine | antinauseant and antipsychotic (the solution should be isotonic to avoid skin reactions) |
| metoclopramide | anti-emetic and antinauseant |

chlorpromazine, diazepam and prochlorperazine should be avoided as they cause skin irritation.

### Corticosteroids

| | |
|---|---|
| dexamethasone | anti-inflammatory (mix with caution to avoid precipitation) |

Some of these drugs can be administered in mixtures but care must be taken to make sure they are compatible and to avoid problems with precipitation and crystallisation if infusions are to last longer than 24 hours.

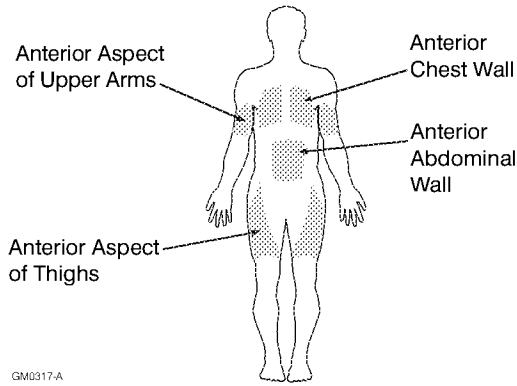
## What is needed for a subcutaneous infusion with the Syringe Driver?

- MS 16A or MS 26 Syringe Driver
- 9 V 'alkaline' battery
- Syringe Driver Cover
- Holster (for mobile patient)
- Rate adjusting key or small flat-bladed screwdriver
- Syringe (any brand and chosen size that can be fitted safely onto the Syringe Driver)
- Infusion set
- Antiseptic treated wipe
- Clear surgical dressing
- Surgical adhesive tape
- Transfer needle for filling syringe with medication from container
- Drugs
- Diluent if required

A subcutaneous infusion pack, Item No. 0105-0117, is available from Graseby Medical, which includes the following sterile items:

1 10 ml Luer lock syringe
1 Transfer needle 0.8 mm (21G/green)
1 Infusion set, 100 cm long with 0.5 mm (25G) 'winged' needle
1 Alcohol saturated wipe
1 Clear surgical dressing, approximate size 6 cm x 7 cm

## Selection of a suitable infusion site




If possible discuss with the patient the preferred method of carrying the Syringe Driver before selecting the infusion site. Areas of oedema, swollen tissue, are not suitable for CSI as drug absorption may not be effective. Avoid the upper arm site in bedbound patients who require turning at regular intervals.

Check the site regularly to make sure the skin tissue is not inflamed or infected. If this occurs a new infusion set should be used with the needle sited at least 3 cm away from the problem site.

## Inserting the Subcutaneous Needle

1. Clean the skin with a swab or antiseptic wipe.

2. Avoid touching the needle itself. Hold it by the wings and insert it at an angle to the skin, then lay it flat. Lifting a fold of skin between the finger and thumb may ease insertion. **Do not bend the needle as this will weaken it and a piece may break off in the patient.**

3. Loop some of the tubing over the wings of the needle and stick it down with some surgical adhesive tape. This helps keep any tension from pulling the needle out of the site.

4. Cover the site with a clear surgical dressing.

## Observation during treatment

1. Assess symptom control, preferably four to six hours after starting treatment. Then daily or when the syringe is changed whichever is sooner.

2. Check the infusion site for irritation, inflammation, infection and needle displacement.

3. Check the syringe and infusion set for precipitation or crystallisation of the medication.

4. Check for leakage at the site and at the syringe to infusion set connection.

5. Check the Syringe Driver for; an exhausted battery, the wrong rate setting and for physical damage. Also see **During the administration**.

# 3 Technical and Performance Specification

**Type:**
Syringe driver with motor driven linear actuator, pulsed motion. Internal low voltage power source. Digital electronic rate control. Automatic switch off when syringe is empty.

**Rate range:**
MS16A 0 - 99 mm/h in steps of 1 mm/h
MS26 0 - 99 mm/24 h in steps of 1 mm/24 h

**Drive accuracy:**
+/- 5%

**Motor operating interval:**
MS16A (420 ÷ Rate) seconds
MS26 (168 ÷ Rate) minutes

**Actuator movement:**
0.12 mm every time motor turns

**Actuator stroke:**
60 mm available

**Syringe sizes:**
2 ml to 35 ml

**Occlusion pressure:**
Dependent on syringe size (internal diameter)
Maximum actuator force 50 N (5 kgf)

**Controls:**
On (and test), Rate ('tens' and 'units' digits)

**Alarm:**
Audible, 3 kHz

**Indicator:**
Yellow solid state lamp

**Battery:**
9 V, primary alkaline, IEC 6LR61 (or 6LF22) type

**Battery life:**

50 full deliveries depending on operating conditions

**Size:**

166 x 53 x 23 mm without a syringe or Cover

**Weight:**

185 grams including battery

**Operating conditions:**

+10 °C - +40 °C, 30% - 75% RH (non-condensing),
700 hPa - 1 060 hPa

**Transport and Storage conditions:**

-40 °C - +70 °C, 10% - 100% RH (non-condensing),
500 hPa - 1 060 hPa

**Materials:**

Case - ABS, Cover and labels - PC, other small plastic parts - POM (acetal) and PA-GF (glass-filled nylon), metal parts - stainless steel, circuit board - epoxy glass fabric.
**Note:** All materials used in this product are latex free.

**Electrical safety:**

Complies with EN 60601-1: 1990 (IEC 601-1:1988). Type BF Applied Part for protection against electric shock.

**EMC:**

Complies with EN 60601-1-2:1993 for emissions and immunity to electromagnetic disturbances. Group 1 Class B for emitted RF radiation according to EN 55011:1991 making it acceptable for use in domestic establishments.

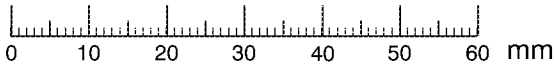
**Medical Device Directive 93/42/EEC:**

CE marked under Annex II, risk class IIb (active medical device). Notified Body: AMTAC (0473).

**Quality system standards used:**

EN ISO 9001 and EN 46001.

## Notes




For further information, please contact your local distributor or
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Part No. 0105-0549-B
June 2002



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