Harrogate and District NHS Foundation Trust

STANDARD OPERATING PROCEDURE FOR SAFE USE OF THE CME T34 SYRINGE DRIVER

1.1. Scope

This procedure covers all areas of Harrogate and District NHS Foundation Trust (HDFT), including hospital and community services where a T34 CME syringe driver might be used. It applies to all registered nurses who have undertaken the required training for the T34 CME syringe driver and may be used for reference by other staff, including prescribers and non-qualified staff.
The CME T34 ambulatory syringe driver is a portable, battery operated device for delivering medication by continuous subcutaneous infusion (CSCI), which complies with all required National Patient Safety Agency (NPSA) standards (NPSA/2010/RRR019).

1.2. HDFT related documents for staff using this Standard Operating Procedure

Medicines' Policy Clinical Policies, Guidelines & Protocols
Equipment Library opening times Medical Devices & Equipment Library
Medical Equipment Policy Policies
Unlicensed Medicines' Policy Medicines
Healthcare Waste Disposal Policy Hospital Infection Control Policies
Standard Precautions Including Hand Hygiene and PPE Hospital Infection Control Policies

1.3. Maintenance of T34 ambulatory syringe drivers

The syringe driver must be serviced every 12 months. Please return to the Equipment Library for exchange when service is due. Please follow the Infection Control Policy for correct decontamination prior to servicing. All syringe drivers are managed by the Equipment Library, but some are kept in community bases.

1.4. Education/ training and competence

All nurses undertaking this role must attend the HDFT syringe driver training session, followed by an annual refresher training session.

1.5. Indications for use

The patient may need a syringe driver if unable to take oral medication for one of the following reasons:

- Persistent nausea/vomiting
- Difficulty in swallowing
- Comatose or semi-comatose

- Intestinal obstruction
- Malabsorption of medication
- Too weak to take oral medication

The decision to administer medication via a syringe driver needs to be taken by the multidisciplinary team in consultation with the patients/carers.

Benefits of using a syringe driver:

- Avoids the necessity of intermittent injections
- Constant level of medication – avoids serum level peaks and troughs which occur with other routes of administration or giving PRN doses
- A combination of drugs may be administered
- The device is lightweight and compact, allowing mobility and independence

1.6. Procedure

1.6.1. Ensure you have all equipment required to undertake procedure

1. T34 syringe driver
2. 9 volt battery (Duracell Procell recommended by manufacturer)
3. Bbraun luer lock syringe – 20ml or 30ml
4. Saf-T-Intima subcutaneous cannula
5. Codan extension set 100cm or similar
6. A semi-permeable transparent adhesive film dressing
7. Drug additive label
8. Lock box and key
9. Diluent (water for injection or 0.9% sodium chloride) NB. unless stated, all medication should be diluted with water for injection
10. Prescribed medication
11. Sharps container
12. Non-sterile gloves
13. Bionector
14. Non-alcohol detergent wipes (to clean syringe driver and lock box)
15. Hospital only – EPMA prescription and syringe driver monitoring chart
16. Community only – Community Palliative Care Prescription Chart WHZO61

1.6.2. Prescription

Nurses must check the medication has been legally prescribed before administration. If there are any concerns regarding the dose, side effects, compatibility, or the appropriateness of the prescription, the nurse must contact the prescriber, a pharmacist or the Palliative Care Team (Tel: 01423 553464).
On the Community Palliative Care Prescription Chart, a dose range for titration of the medication can be prescribed with clear instructions on how and when to titrate them.
Anticipatory PRN medication should be prescribed in addition to the syringe driver.
When the prescribed medicine is altered, a new syringe and new infusion administration section on the check/administration charts must be used. The medication should be marked as discontinued and dated on the prescription chart.

When discontinuing a community syringe driver prescription chart, the chart must be marked 'discontinued' and scored through; the chart must be signed and dated by the prescriber.
EPMA prescriptions should be discontinued on the system.
N.B. For patients already on a Transdermal (TD) medication (e.g. a fentanyl patch) the TD patch should remain in place when the syringe driver is commenced and continue to be changed as prescribed.

1.6.3. Prepare the patient

Prior to starting a syringe driver, its use should be fully discussed with the patient and his/her family. Explanation is needed about what a syringe driver is, how it works and why its use is indicated. The benefits and risks of syringe drivers should be explained and informed consent for administration sought.
Give patient "INFORMATION ABOUT YOUR SYRINGE DRIVER" leaflet.

1.6.4. Prepare the medication

In the community setting, the nurse(s) should count the number of ampules of medication and check this matches the amount documented on the Community Palliative Care Prescription Chart (WHZ061) prior to preparing the syringe.
In hospital settings, nurses should follow the controlled drugs section of the Medicines' Policy Medicines Policies, etc.
In HDFT, up to three compatible medications can be mixed in one syringe (see Appendix 1), unless under advice from the Palliative Care Team.

1. Give a dose of PRN medication if the patient has uncontrolled symptoms prior to commencing the syringe driver
2. Draw up each medication in a separate syringe to the prescribed dose
3. Add each medication to the Braun Omnifix (20ml or 30ml) syringe and dilute with water for injection (or sodium chloride 0.9% if stated on the prescription)
4. Check for any crystallisation or cloudiness – do not use if present
5. Place a drug additive label on the syringe, ensuring it does not obscure the markings on the syringe barrel
6. Connect to extension set and manually prime the line
7. Dispose of all ampoules and additional equipment used

1.6.5. Prepare the T34 Syringe driver

1. Check syringe driver is within service date
2. Insert 9V battery
3. Press power on
4. Before powering on, ensure the barrel clamp arm is down and no syringe is in place
5. Press and hold down the ON/OFF key
6. Observe automatic movement of the actuator (Pre- Loading)
7. Check information screens
8. Wait until the actuator stops moving and the syringe sensor detection screen (Load Syringe) displays
9. Check battery level using the info key (if below 40% discard battery)

10. Align syringe to designated areas and load the syringe into the pump
11. View the display screen to check that the syringe brand and size displayed matches the one placed into the pump (if they DO NOT match return the T34 CME syringe driver to the equipment pool)
12. Visibly check the volume in the syringe matches the volume displayed
13. Check time is 24 hours and press confirm

1.6.6. Site the subcutaneous cannula (saf-T intima)

1. Explain and discuss the procedure with the patient
2. Wash hands with soap and water or alcohol hand rub and assemble required equipment
3. Expose the chosen site for infusion

   Preferred sites are:
   - The lateral aspects of the upper arms and thighs
   - The anterior chest below the clavicle
   - The abdomen
   - The back

   Sites not to be used:
   - Lymphoedematous limbs
   - Abdomen when distended by ascites or abdominal
   - disease
   - Sites over bony prominences
   - Previously irradiated skin area
   - Sites near a joint

4. Hold the wings on the Saf-T-Intima between the thumb and ring finger extending the tubing straight whilst holding the 'Y' port in the same hand. Rotate the white base through 360 degrees (i.e. one full turn) in order to break the seal over the 'needle introducer' within the subcutaneous catheter – you should see the needle rotate within the catheter
5. Grasp pebbled side of wings of the Saf-T-Intima, pinching wings firmly together to lock the needle in place
6. Insert the Saf-T-Intima needle subcutaneously up to a 45 degree angle
7. Open the wings flat against the skin (pebble side down)
8. Apply transparent dressing over the insertion site and the wings of the cannula
9. Apply firm fingertip pressure over the wings of the cannula (avoiding the centre where the needle retracts) and simultaneously grasp the pebbled end of the white shield and pull in a straight continuous motion until the needle has fully withdrawn into the blue cylinder
10. Gently remove the cylinder from the cannula port (if it has not released spontaneously) exposing the adaptor with the rubber bung
11. Place the needle shield in the sharps container
12. Remove white clamp from the cannula line
13. Prime the Saf-T-Intima with 0.2 ml of water for injection

14. If necessary, secure cannula tubing with a small strip of tape just above the Y connection (when sited on a limb, secure to the front of the limb to aid comfort)
15. Change the rubber bungs for bionector adaptors. Document the siting and date of insertion on the invasive devices connection record
16. Wash and dry hands thoroughly and use alcohol hand rub in accordance with Infection Control Policy

1.6.7. Start infusion

1. Check patient details against prescription
2. Connect line to extension set
3. Click yes to start infusion
4. Check green LED light is flashing
5. Activate keypad lock by pressing and holding the info key
6. Place syringe driver inside lockbox and lock it

1.6.8. Monitoring

For hospital in-patients the syringe driver should be checked every four hours

Assess:

- Skin – pain, inflammation, leaking, bleeding, redness, rash
- Mechanical – screen shows pump infusing and LED light flashing, line and extension set firmly connected, battery level
- Medication – □□□Labelled correctly, solution clear, record volume infused (VI)
  and volume to be infused (VTBI) on monitoring chart

If the T34 CME syringe driver alarms refer to troubleshooting guide (see Appendix 3)
If there is no alarm but an issue is identified by the nurse conducting the check, refer to Appendix 5 for appropriate action.
For hospital in-patients staff should use the syringe driver monitoring chart (see Appendix 4) For community patients, any additional monitoring after starting the infusion should be recorded on the community palliative care prescription chart

1.6.9. Changing the syringe

Interruption in delivery, the same syringe to continue
The syringe driver will display “Press YES to resume NO for new syringe”. Press Yes to continue infusion at same rate. If NO is pressed the driver will delete the infusion memory and deliver the remaining contents over 24 hours as it will presume this is a new syringe, underdosing the patient.

Replace with same medication
Follow the procedure as above but do not re-prime line or re-site the Saf-T-intima. Replace the existing syringe with a newly primed syringe. The giving set can be used for up to five days as long as the same medication is used.

When changing the syringe driver using new medication
Follow the procedure as above but change and re-prime the giving set. Leave the Saf-T-Intima in situ if there is no site reaction. Attach the newly primed line to the cannula.

Discontinuing the infusion
Stop the infusion and switch off the T34 syringe driver. Remove syringe and document any wastage. Assess need to remove Saf-T-Intima or leave in situ for potential PRN medication. Flush with 0.2mls water for injection if to remain in situ.

1.7. Administering PRN medication via Saf-T-Intima whilst infusion running

Ensure drug to be administered is contained in syringe driver prescription, if not a separate injection will need to be given or a separate Saf-T-Intima inserted for bolus injections.

1. Explain the procedure to the patient/carer; obtain verbal consent if possible
2. Wash and dry hands thoroughly, use alcohol gel and put on gloves
3. Draw up prescribed medication in a 2ml syringe
4. Do not give any more than 2ml volume as a bolus, as this can compromise site and cause discomfort
5. Draw up 0.2ml of water for injection in a separate syringe
6. Check the site for any swelling, redness or bleeding. Change the cannula as per policy if any of the above are present
7. Clean the bionector adaptor with an alcohol swab
8. Slowly administer the bolus injection followed by the 0.2ml water for injection flush

2. REFERENCE AND ASSOCIATED DOCUMENTS

Dickman, A. and Schneider, J. (2016) *The Syringe Driver. Continuous Subcutaneous Infusions in Palliative Care*. 4th Ed. Oxford: Oxford University Press.

Mitten, T. (2001) Subcutaneous drug infusions: a review of problems and solutions. *International Journal of Palliative Nursing* 7(2), 75-85

National Council for Palliative Care (2018) *Palliative Drugs Online*. Available at http://www.palliativedrugs.com [Accessed 3rd Apr. 2018].

Nursing and Midwifery Council (2015) *The Code: Professional Standards of practice and behaviour for nurses and midwives.* London: Nursing and Midwifery Council.

Sims Graseby Medical Ltd. (2002) *MS 16A syringe driver and MS 26 syringe driver instruction manual.* Watford: Graseby Medical Limited.

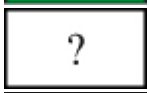
Twycross, R., Wilcock, A. and Howard, P. (2017) *Palliative Care Formulary (PCF6).* 6th Ed. Available at https://www.palliativedrugs.com

3. APPENDICES

3.1. Appendix 1: Syringe driver compatibility charts (referenced from the Palliative Care Formulary 5)

The Palliative Care Team or Pharmacy Department have access to any chart updates on https://palliativedrugs.com

General key for charts

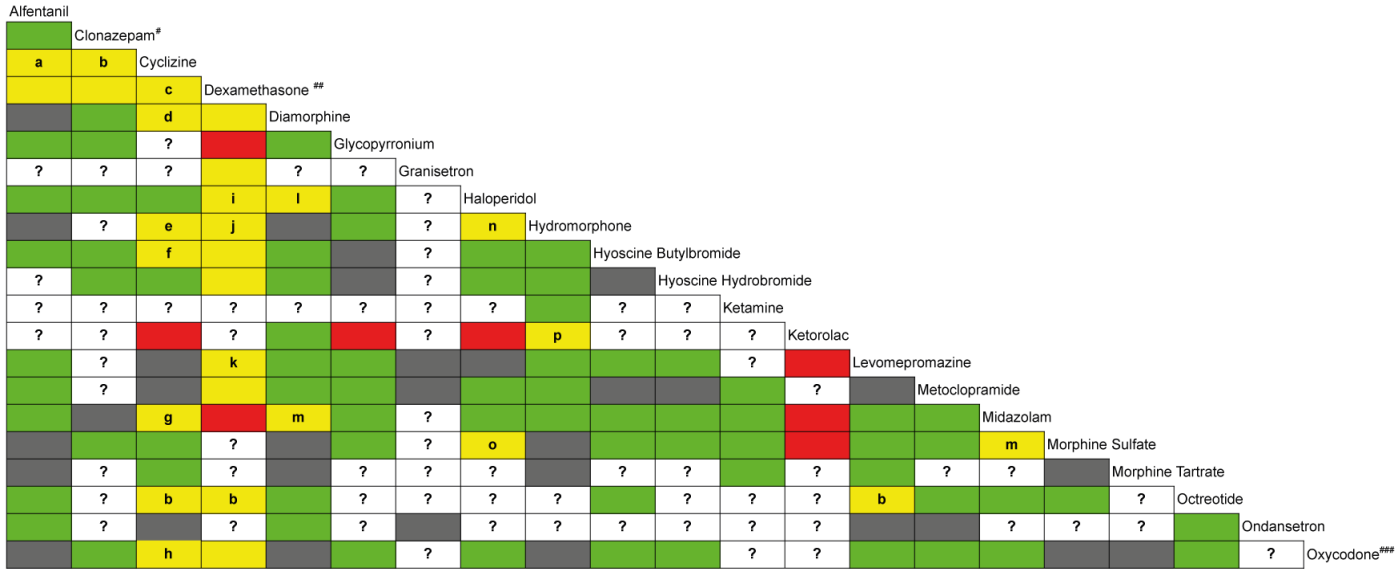
	Do *not* use, *incompatible* at usual concentrations
	Use with caution, compatibility may depend on order of mixing or drug concentrations
	Reported compatible (data may be observational, physical or chemical, i.e. practice or evidence-based)
	No data. Please provide information on this combination to the Syringe Driver Survey Database (SDSD)
	Not applicable or not generally recommended e.g. seek specialist advice when combining multiple anti-emetics
#	Use non-PVC tubing; up to 50% of a dose of clonazepam is absorbed by PVC tubing
##	Dexamethasone sodium phosphate can generally be given once daily by SC bolus injection. If given by CSCI, to minimize the risk of incompatibility, always add it last to a maximally diluted syringe
###	Compatibility data for oxycodone 10mg/mL formulation only

Abbreviation

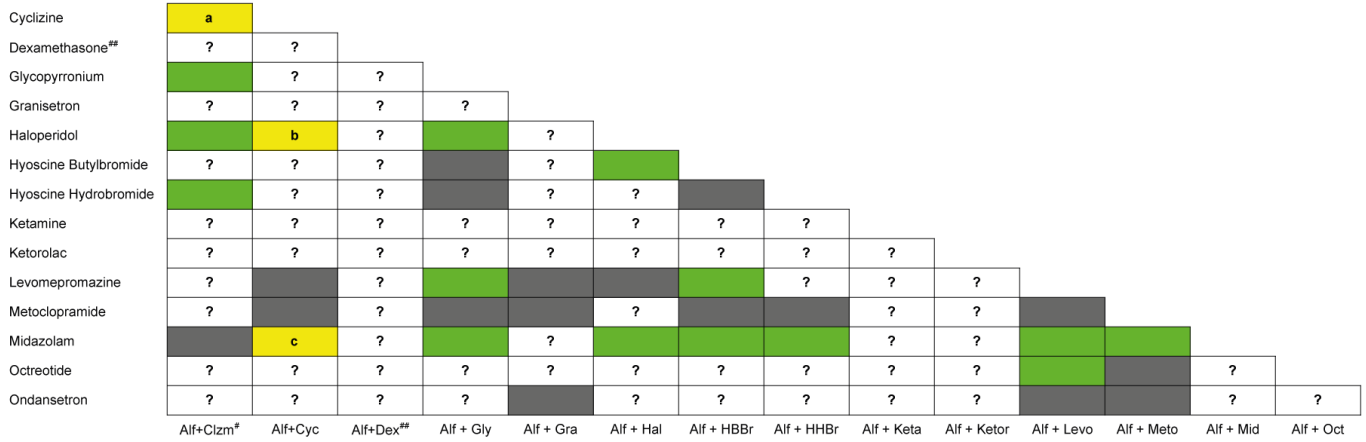
Alf	Alfentanil
Clzm	Clonazepam (not UK)
Cyc	Cyclizine
Dex/Dexamethasone	Dexamethasone sodium phosphate
Dia	Diamorphine
Gly	Glycopyrronium
Gra	Granisetron
Hal	Haloperidol
HBBr	Hyoscine butylbromide
HHBr	Hyoscine hydrobromide
Hyd	Hydromorphone
Keta	Ketamine
Ketor	Ketorolac
Levo	Levomepromazine

Meto	Metoclopramide
Mid	Midazolam
MS	Morphine sulfate
MT	Morphine tartrate (not UK)
Oct	Octreotide
Ond	Ondansetron
Oxy	Oxycodone 10mg/mL

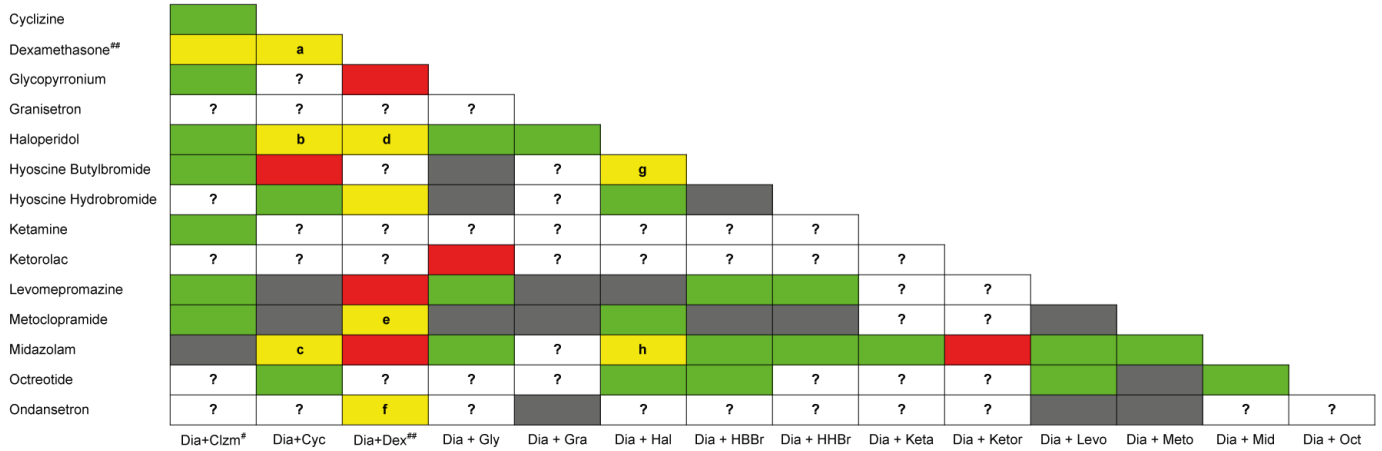
Compatibility chart for *two* drugs in Water for Injection



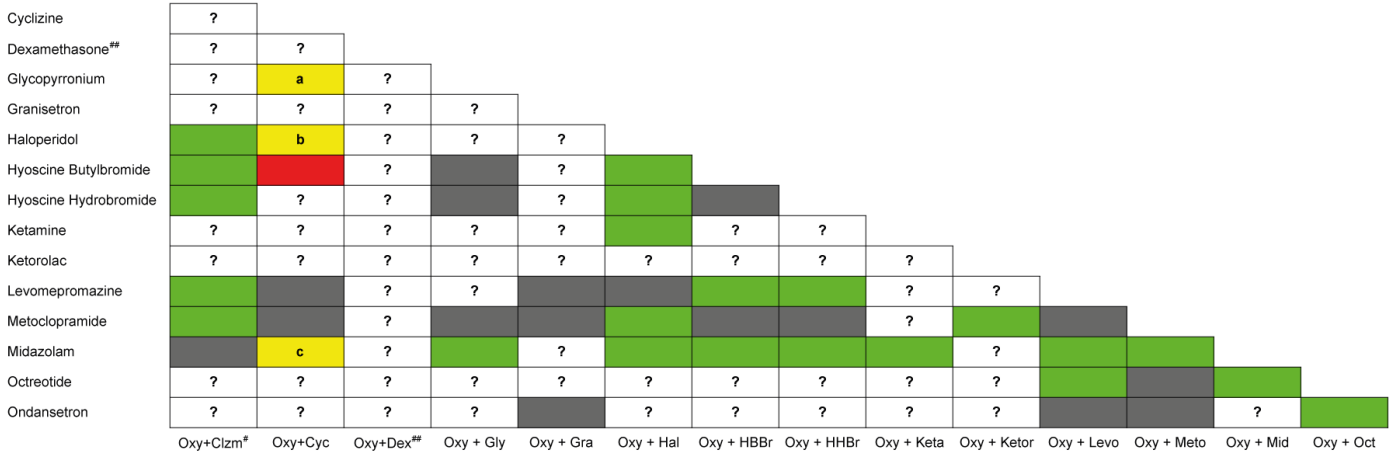
Compatibility chart for alfentanil: *three* drugs in Water for Injection



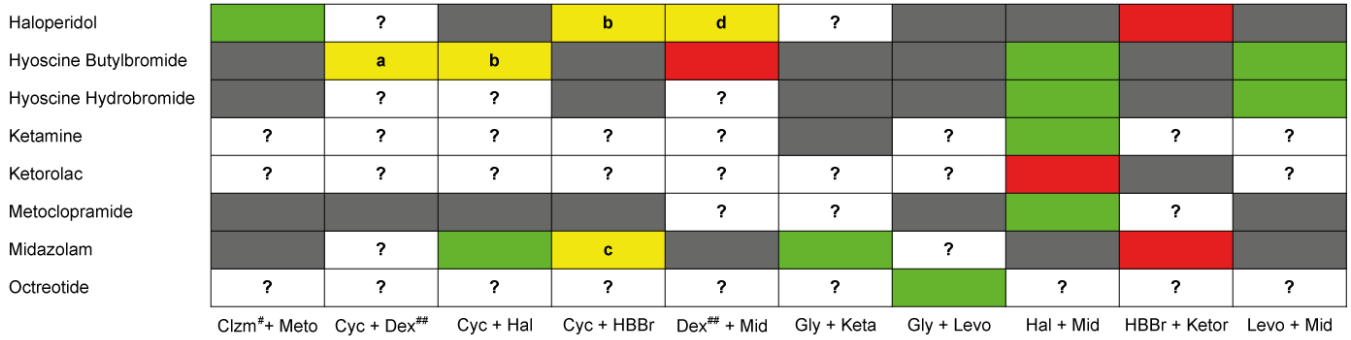
Compatibility chart for diamorphine: *three* drugs in Water for Injection



Compatibility chart for oxycodone 10mg/mL formulation: *three* drugs in Water for Injection



Compatibility chart for non-opioids: *three* drugs in Water for Injection



3.2. Appendix 2: Troubleshooting guide

Display	Possible Causes	Action Required
Low battery	Alert: battery is almost depleted	Prepare to change battery
Syringe nearly empty	Alert: infusion will end soon	Prepare to change syringe or turn pump off
Pump paused too long	Alarm: Pump has been left in STOP mode (on hold) for 2 minutes	Either start the infusion or turn pump off
End Battery	Alarm: battery is depleted	Change battery
End Programme/Syringe	Alarm: infusion is complete	Close down or start new infusion
Syringe displaced, check syringe	Alarm: one or more of the syringe detection sensors is not detecting	Check screen messages for assistance. Check the syringe placement and re-site as necessary.
Occlusion Check line and syringe	Alarm: patient access device is either blocked, clamped or occluded	Flush/replace access device, ensure the clamp has been removed. If occlusion cleared, then resume the infusion. Alternatively turn pump off and replace syringe medication and infusion line.
System error. Press and hold INFO for details	Alarm: system error	Remove pump from use, return to Medical Engineering. Document error number and a description of the problem.

3.3. Appendix 3: Troubleshooting when no alarm sounds

Problem	Action Required
Infusion slow or stopped	• Check site for swelling or inflammation • Check tubing is not kinked or stretched • Check connections intact • Check actuator is still against plunger • Check rate setting for accuracy • If any concerns regarding the driver – remove from the patient, complete Datix report and send to Medical Engineering
Infusion too fast	• If major over-infusion occurs – stop infusion, check condition of patient and seek medical advice. Complete Datix report as medication incident • Check rate is set correctly • Check for disconnection of line • Check syringe is securely in place • Check no air present in line • If any concerns regarding the driver – remove from the patient, complete Datix report and send to Medical Engineering
Site irritation	• Change site • Discuss possible changes of drugs with Doctor/Pharmacist/ SPCT • Dilute drugs to a larger volume • Consider separating drugs into different syringes if more than one is being used • Consider infection or allergy • For severe site reactions consider other treatment options – discuss with doctor
Cloudiness, precipitation, colour change of drug	• Stop infusion and discuss with Doctor/Pharmacist/SPCT • Check compatibility information • Dilute to larger volume • Consider separate syringes • Keep away from sunlight • Commence new infusion through new line

3.4. APPENDIX 4: SYRINGE DRIVER MONITORING CHART (T34)

Harrogate and District NHS Foundation Trust

ADMINISTRATION – to be completed by nurse when infusion commences			OBSERVATIONS – to be recorded by nurse at least every 4 hours										
Prescribe each medication on EPMA Please refer to the Trust Protocol for information on setting up & using this equipment for medication administration by continuous subcutaneous syringe driver			Check	Rate	Is light flashing? (Y/N)	VTBI	VI	Battery	Time remaining	Site position	Site OK? (Y/N)	Initial
Date and time commenced:												
Signature 1: Print name:	Signature 2: Print name:											
Medication	Batch	Expiry										
Syringe Driver No:												

Date and time commenced:												
Signature 1: Print name:	Signature 2: Print name:											
Medication	Batch	Expiry										
Syringe Driver No:												

Affix Patient Label

WHZ065

Instructions for checks in use

Affix Patient Label

The following checks must be made and recorded at least every **four** hours in hospital. If any problems are found, refer to the Troubleshoot Checklist on pages 18/19 in the syringe driver protocol and record in the nursing documentation:

- Check that the rate is correct, that the light is flashing green and the battery has above 40% of charge left.
- Check that the infusion is running to time.
- Check the infusion site for signs of inflammation, swelling, pain or site reaction.
- Check the contents of the syringe and tubing for cloudiness, crystallisation, colour change, kinks or blockage.
- Check that the keypad is locked.
- Check that the T34 is secure in the lock box.

ADMINISTRATION – to be completed by nurse when infusion commences			OBSERVATIONS – to be recorded by nurse at least every 4 hours									
			Check time	Rate ml/hr	Is light flashing? (Y/N)	VTBI	VI	Battery Power	Time remaining	Site position	Site OK?	Initial
Date and time commenced:												
Signature 1: Print name:	Signature 2: Print name:											
Medication	Batch	Expiry										
Syringe Driver No:												

Date and time commenced:												
Signature 1: Print name:	Signature 2: Print name:											
Medication	Batch	Expiry										