Humber Teaching
NHS Foundation Trust

SYRINGE DRIVER PROTOCOL (Prot525)

(Syringe drivers: BD BodyGuard T and McKinley T34 V3 with BodyGuard software programme upgrade)

PLEASE NOTE - Syringe Driver Protocol V 1.05 only relates to: The BD BodyGuard T and The McKinley T34 V3 (with BodyGuard software upgrade) models

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Author/Lead Job Title	Debi Adams, Professional Lead Palliative & End of Life Care Jane Dacre, Palliative Care ANP Sadie Milner, Quality Standards Practice Development Nurse
Director's sign off (Name, Role and Date)	Hilary Gledhill, Executive Director of Nursing, Allied Health and Social Care Professionals - May 2022
Consultation (Date and nature of contact)	Physical Health and Medical Devices GroupCare Group Clinical Networks Chief Pharmacist, Weeliat Chong Community Clinical Network Group May 2022 Drugs and Therapeutics Group May 2022
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Date of Next Review	December 2025
Date approved and name of Approving Group	Physical Health and Medical Devices Group 14 December 2022

VALIDITY – Protocols should be accessed via the Trust intranet to ensure the current version is used.

CHANGE RECORD

Version	Date	Change details
1.00	*08/01/19*	*Changed from a policy to a protocol with procedure.*
1.01	*10/07/19*	*Information regarding the number of drugs in the syringe pumpwas added in section 5.6 (Preparing the Syringe) and in the Drawing Up criterion in Appendix 1. This was approved by the Drugs and Therapeutics Group on 25 April 2019.*
1.02	*01/04/20*	*Macmillan nurse independent prescribers are added to section 5.6'Number of drugs in the syringe pump' for the duration of COVID-19 crisis*

1.03	*09/04/20*	*Revised Section 5.6 "Number of drugs in the syringe pump"* *Addition of Appendix 1: Commonly used medications and compatibilities*
1.04	*19/04/20*	*Update to training link in Section 7. Will require a full review by January 2022*
1.05	*May-22*	*Incorrection noted on Appendix 1 Commonly used medications and compatibilities. Appendix 1 removed. Removed reference to https://www.palliativedrugs.com/syringe-driver-database-introduction.html and the Syringe driver drug compatibility section on the Palliative Care Matters website, available at: http://m.pallcare.info/*
1.06	*12/05/22*	*McKinley T34 V2 syringe drivers are now obsolete. Two new types of syringe drivers purchased by Humber Teaching NHS Foundation Trust: the BD BodyGuard T and the McKinley T34 V3 with Bodyguard software upgrades. Protocol extensively revised in sections 2,3,4,5,7,10 and Appendices to reflect the requirements for these new syringe drivers. Removal of excessive medication detail. Inclusion of links to regional and national evidence-based resources for medication information.* *Approved by Community CNG, and DTG – May 2022* *Final approval through PHMD 14 June 2022*
1.07	*14/12/22*	*PN2022-21 incorporated into document. Battery life data review due to reported incidents.* *Removed obsolete community chart* *Removed clinical competency- now online- replaced with link* *Approved at PHMD Group (14/12/22).*

Contents

1. INTRODUCTION

This procedure relates to the use of Humber Teaching NHS Foundation Trust owned BD BodyGuard T and McKinley T34 V3 (with BodyGuard software programme upgrade) syringe drivers.

The procedure provides guidance and instruction on the indications for, safe use of, and medication management when using these syringe drivers.

A Syringe Driver is a portable battery-operated device that is used to deliver a continuous subcutaneous infusion of medicines. Most often used to provide symptom relief for palliative patients who are unable to take medicine effectively by other routes.

2. SCOPE

This protocol applies to all services provided by Humber Teaching NHS Foundation Trust (herein known as the Trust).

This protocol applies only to the use of the syringe driver machine models: **BD BodyGuard T and McKinley T34 Version 3 (with BodyGuard software upgrade)** owned by the Trust.

For this protocol, the term **Syringe Driver specifically and only refers to the BD BodyGuard T and the McKinley T34 Version 3 (with BodyGuard software upgrade**)

These two machines and no other models must be used, as recommended by the Medicines and Healthcare products Regulatory Agency (2021) [1].

All syringe driver infusions should only be administered subcutaneously.

This protocol must be followed by all registered nurses and medical staff who are authorised, responsible and competent in the administration of drugs via these specific Syringe Drivers and applies to all Trust staff in all locations.

3. PROTOCOL STATEMENT

To ensure the safe administration of medication via syringe driver and promote standardised practice across the Trust:

To provide a clear governance and competency framework to ensure a safe and consistent approach to the use of Syringe Drivers.

To provide details of how to set up and administer medication via a Syringe Driver

To link to accessible evidence-based information about the common medicines, safe combinations, and correct use of medicines in a Syringe Driver.

4. DUTIES AND RESPONSIBILITIES

Director of Nursing, Allied Health and Social care Professionals

- Responsible for ensuring that the Syringe Driver Protocol is in place and that all staff working in the Trust are aware of, comply with and operate within this protocol

Service Managers/Clinical Leads and Team Leaders

- Responsible for ensuring that staff have access to this Protocol and other relevant SOPs and policies, as well as training and support.
- Ensures the provision of training and support to the registered practitioner to administer medication via a syringe driver and that the task complies with all relevant trust policies and SOPs.
- Responsible for ensuring that individual's competencies are implemented, achieved, and maintained.

All Clinicians

It is the responsibility of individual clinicians to ensure that they undertake the specified training to use this piece of equipment and are deemed competent through assessment, knowledge, and ongoing training

Each health care professional will be required to complete annual online competency assessment and be deemed competent to undertake this clinical procedure by their line manager. See APPENDIX 6 Training Requirements.
All clinicians to work within their professional Codes of Practice. For nurses; Nursing & Midwifery Council (2018) [2] The Code: Professional standards of practice and behaviour for nurses, midwives and nursing associates and with local policy.

5. PROCEDURES

5.1. Decision Making

The decision to administer medication via a syringe driver must be taken in partnership with the patient (if practical), the family/carer and the nursing and medical team. If any reason to doubt the patient's mental capacity a mental capacity assessment should be undertaken and, if indicated, a Best Interest Decision should be made and documented as per local policy.

Giving medicines via a syringe driver offers an alternative method of administration. It is not necessarily a superior method, particularly when the patient is still able to take medicines orally.

5.1.1 When to consider administration of medication via a syringe driver:

- When patient has uncontrolled symptoms, AND
- When other routes of administration are inappropriate due to:
  - Nausea and Vomiting
  - Dysphagia
  - Severe Weakness
  - Unconsciousness
  - Gastrointestinal problems e.g. diarrhoea, bowel obstruction
  - Cachexia
  - Inability to administer medication via oral route e.g. Head/neck cancers
  - Malabsorption
- If a patient is requiring frequent 'As Required' (PRN) subcutaneous injections to control symptoms
- Care in the last days and hours of life – A syringe driver should only be started if it is indicated for symptom management. Not all dying patients will require a syringe driver.

5.1.2 Common symptoms managed by medication via a Syringe Driver

- Pain
- Nausea and vomiting
- Agitation
- Breathlessness
- Excessive secretions
- Seizures
- Terminal agitation

5.1.3 Advantages of administering medication via a Syringe Driver

- Increased patient comfort, control of distressing symptoms
- Accurate absorption
- Peaks and troughs of intermittent doses are eliminated.
- Plasma concentration levels of medicines remain constant
- Timely changes to medication in response to changing symptoms
- Ability to infuse a combination of medicines to control multiple symptoms
- Symptom control may be achieved without the need for repeated injections.
- Maintains patient and family sense of independence
- Less reliance on 'unplanned' services
- Subcutaneous cannulation is less traumatic than IV cannulation and manageable in community settings.

5.1.4 Disadvantages of administering medication via a Syringe Driver

- Patient may remove repeatedly in confused state
- Erythema, irritation or swelling at infusion site, may also affect absorption
- Patient may find machine cumbersome if still mobile

5.1.5 Possible contraindications to use

- Patient non-consent with mental capacity for decision
- Frequent removal of infusion by patient in confused state
- Infection and broken skin at infusion site
- Patients with clotting disorders because of risk of bleeding at the infusion site
- Patients who have poor tissue perfusion
- Peripheral vascular disease of lower extremities
- Pre-existing oedema

5.2. Patient Assessment

Individual assessment must be undertaken by competent registered nurse or medical doctor to identify appropriateness and suitability for medication via syringe driver and the most appropriate infusion site. For details of training competence see section 7

Assessment, rationale, discussion, and implementation plan must be clearly documented in the patient's clinical record, including updating any relevant care plans, templates and shared care records e.g. Electronic Palliative Care Coordination System.

Ensure patient, family and carers understand the purpose of the syringe driver and

medication. Provide with the Trust Patient Information Leaflet. Allow time to explore any questions or concerns.

5.3. Medication

Medication must be prescribed and stored correctly according to local protocol

The use of unlicensed medicines is widespread in palliative care and accepted as standard practice. The mixing of two or more licensed medicines in a syringe driver is considered an unlicensed preparation. British Pain Society and the Association for Palliative Medicine of Great Britain and Ireland [3] endorse the use of unlicensed medicines in palliative care and pain medicine to be in the best interests of the patient and generally represents standard practice. Also supported by Department of Health guidance on mixing of medications (2010) [4]

For Medication and Prescribing Resources please see APPENDIX 1, this includes A Guide to Symptom Management in Palliative Care (valeofyorkccg.nhs.uk) [5] and Scottish Palliative Care Guidelines - Syringe Pumps [6]

5.3.1 Stability and Compatibility

- Medicines should be available in injectable form and stable in solution for 24 hours.
- A single medicine should be compatible with the diluent for 24 hours.
- Multiple medicines should be compatible with each other and with the diluent and remain so for 24 hours.
- To check safe drug doses, stability, compatibility, and diluents refer to Scottish Palliative Care Guidelines - Syringe Pumps),[5] and A Guide to Symptom Management in Palliative Care (valeofyorkccg.nhs.uk) [6] and /or contact local Specialist Palliative Care Team for advice. See APPENDIX 1

If **3 drugs in combination from the following list** are required, **specialist palliative care authorisation** is not required. Confirm safe doses and combinations using guidelines as above:

- Morphine*
- Oxycodone*
- Midazolam
- Haloperidol
- Hyoscine Butylbromide
- Diamorphine*
- Levomepromazine

* **NOTE** only one opioid should be used in any 3-drug combination

If any drugs from outside the list above, or more than 3 drugs need to be combined in one syringe, then specialist authorisation must be sought and documented in the patient's clinical record, with instruction detailing the combination of medications, doses, diluent, and rationale. Authorisation should come from a Palliative Medicine Consultant, Doctor with Specialist Interest in Palliative Care or a Specialist Palliative Care Nurse Independent Prescriber who has reviewed the patient. Further authorisation (as above) must be sought in the case of any changes to the prescription. If no authorisation is in place, then the drugs cannot be combined and 2, or more, syringe drivers will be required.

If in any doubt or out with scope of competence, always discuss with GP or local specialist palliative care team before preparing syringe driver medication.

In-hours and Out of Hours contact details as below.

Contact for further help & advice					
York Specialist Palliative Care Team (SPCT)			Scarborough Specialist Palliative Care Team (SPCT)		
In hours	Community SPCT Hospital SPCT St Leonards Hospice	01904 777770 01904 725835 01904 708553	In hours	Community SPCT Hospital SPCT St Catherine's Hospice	01723 356043 01723 342446 01723 351421
Out of hours	GP OOH St Leonards Hospice	0300 1231 183 01904 708553	Out of hours	GP OOH St Catherine's PalCall	NHS 111 01723 354506

5.3.2 Preparing the medication

- Prepare the medication using clean technique
- Use only 20 or 30 ml Luer Lock BD Plastipak or Braun Omnifix syringes.
- Final fill volumes:
  - 20ml syringe up to 17ml
  - 30ml syringe up to 23ml
- Invert the syringe to mix, look for signs of cloudiness or crystallisation. If this occurs, discard and seek advice.
- Label the syringe taking care to apply the label so it is flat against the syringe. The label should state; the patient's full name and date of birth, date and time and drug dose(s), both names of staff setting up the machine (in community one staff member), the diluent used and final fluid volume and expiry date.
- Manually prime the infusion set line
- NEVER add additional medications to a syringe after delivery in syringe driver has commenced

5.4. Equipment and Resources

Before the procedure is undertaken, it is essential that all the equipment required is selected, the service and expiry dates are checked as in date, and that the devices used are clean and in good working order.

See APPENDIX 3 "Preparing and setting up syringe driver" for full list of necessary equipment and resources.

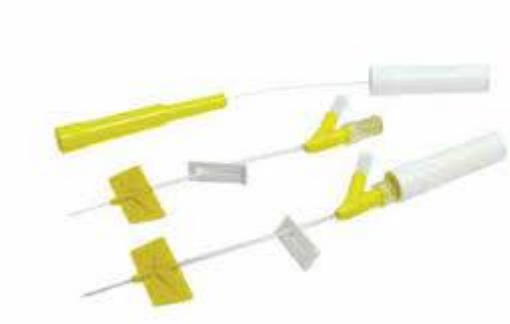
5.4.1 BATTERIES.

Only use: WPA147 nx-power tech, WPA244 Duracell Plus, or WPA156 Duracell Ultra.

Batteries must remain in machine even when not in use. Internal clock battery will deplete overtime, with increased risk of incorrect date and time if not checked and corrected

5.5. How and where to insert Subcutaneous Infusion device

Only use BD Saf-T intima subcutaneous infusion device



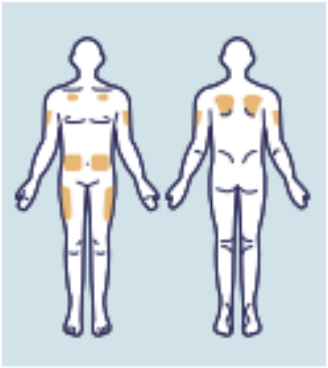
Consider the following when selecting a site:

- Site preference of the person
- The availability of subcutaneous tissue, patient mobility and pressure care needs

- Avoid bony prominences, areas of broken skin or infection, recently irradiated areas, tumour sites, skin folds, scarred areas, joint proximity, areas of poor circulation, ascites, oedema and lymphoedema, or areas of compromised lymph drainage (e.g. mastectomy).

The common sites for subcutaneous cannula insertion are shown in the image.

- Anterior chest wall
- Anterior aspect of upper arms
- Anterior abdominal wall
- Anterior aspect of thighs
- Occasionally the back between the scapulae, i.e. when a patient is agitated



See **APPENDIX 2** for more detailed information about infusion device and management of site

5.6. Setting up syringe driver

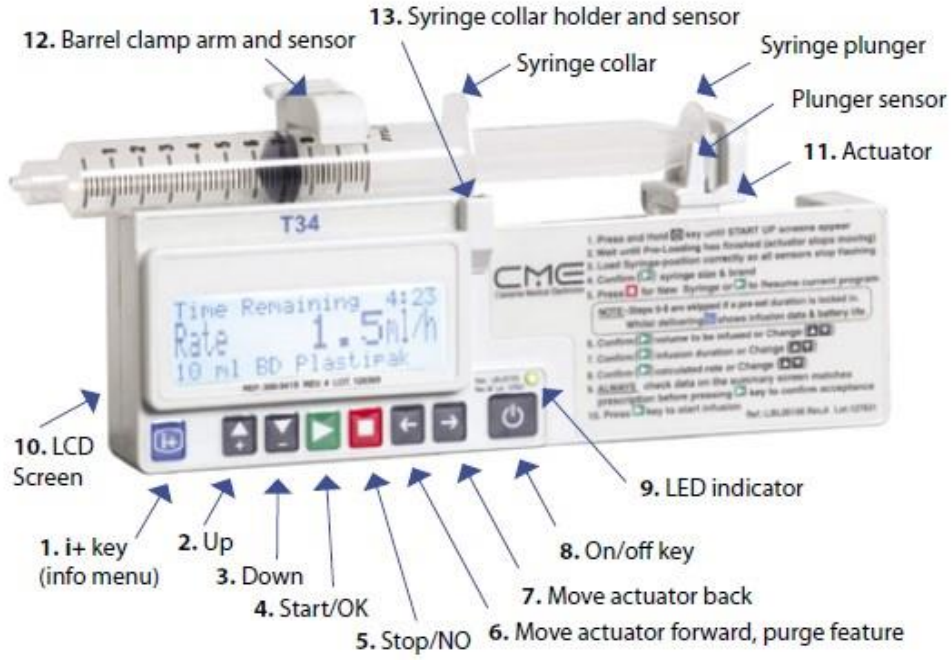
For comprehensive guide see APPENDIX 3: "PREPARING AND SETTING UP SYRINGE DRIVER". This includes the following guidance:

- T34 V3 and BD BodyGuard syringe driver features
- Keys and display screen information and pictures
- Information on battery types and battery management
- Equipment and resources
- Procedure for setup new syringe driver
- Monitor the infusion and syringe driver over time
- Subsequent infusions
- Alerts and alarms

- REMEMBER: Always check the syringe driver carefully to ensure that you have the correct model; T34 V3 or BD BodyGuard.

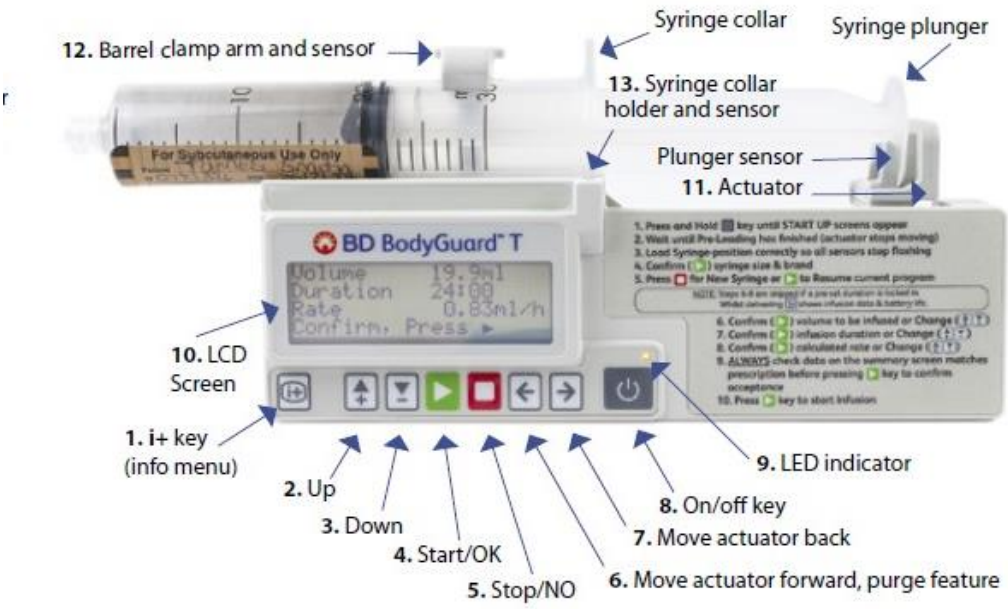
T34™ (3rd edition)

Front of pump: keys and display screen



BodyGuard™ T

Front of pump: keys and display screen



5.6.1 Key changes in The BD BodyGuard T and The McKinley T34 V3 (with BodyGuard software upgrade) from previous model (T34 V2) as used by The Trust

- **Alarm function 15 minutes before end of infusion**
- **Rear drain changed to avoid fluid accumulation**
- **LED screen-**
  green- information alarm/signal
  Yellow- low priority alarm/signal
  Red- high priority alarm/signal
- **Key pad has universal symbols- No words**
- **Battery must be kept in situ at all times, even when SD not in use. Internal clock battery will eventually run out without backup.**
- **IMPORTANT: Check entry log that date and time are accurate before starting the infusion. If not correct, adjust to correct date and time**
- **Bolus option available – Not to be used for patients under care of Humber Teaching Foundation NHS Trust**
- **BATTERIES Only use: WPA147 nx-power tech, WPA244 Duracell Plus, or WPA156 Duracell Ultra**

See APPENDIX 7 for 2 side A4 Powerpoint Slides of key changes. To be read by all syringe driver competent registered nurses.

5.7. Monitoring whilst Syringe Pump in Use

The results of checks should be documented on the monitoring chart and signed by the person checking. If any checks are not carried out, e.g. site check to prevent disturbing patient when asleep, record this and the reason.

- Monitoring of the syringe pump within i**npatient** settings will take place at least four- hourly or as required
- Monitoring in the **community** will take place at least once every 24 hours. Monitory chart within 'York and Scarborough Anticipatory and Syringe Driver Chart' Available in local hubs.
- Assess symptom control regularly
- Check site for redness, inflammation, infection, discomfort, pain, leakage of fluid or Saf-T intima subcutaneous infusion device displacement.
- Check syringe and infusion line for crystallisation, precipitation, cloudiness or colourchange of contents, leakage and the presence of large air bubbles.
- Check the display – pump is delivering, infusion rate is as programmed and record ratesetting.
- Press the  key to check:
  - Single press – VTBI (volume to be infused) and volume infused and record.
  - Double press – battery life remaining.
- Visual checks of fluid remaining in syringe at each check and compare with pumpreading.
- Check that the line is securely attached to both the syringe and the patient and that theline is not leaking, kinked or trapped.
- Assess patient for efficacy and side effects of medication.
- Check for signs of toxicity
- Seek advice from theappropriate team member if needed.

5.8. Extra guidance in using the syringe driver

- It takes 3-4 hours for drugs to reach therapeutic blood plasma levels via the syringe pump, therefore, a breakthrough (PRN) dose may require to be administered when the syringe driver is set up if the patient has unrelieved symptoms.

- Avoid placing syringe driver higher or lower than the infusion site, may result in faster or slower infusion rate.

- Never take a syringe that is not empty off the pump, if it is still connected to the patient. The infusion line must be disconnected and capped, or the line clamped before removing the syringe to prevent free flow and the risk of serious injury or death to the patient.

- Do not allow it to get wet e.g. in the bath or shower. There is a real risk that it will malfunction and must be condemned

- See **APPENDIX 5 for Troubleshooting Guide**

5.9. Care of Infusion Site

5.9.1 Infusion site assessing and changing

- Assess the infusion site every four hours in an inpatient facility and daily in community settings
- The infusion site may be left intact for up to seven days [7] It should be changed sooner if the site becomes inflamed or painful. Can be left for over days in exceptional circumstances where patient care may be compromised.
- When re-siting, place the new infusion at least 3cm away from previous sites
- If evidence of pain, inflammation or poor absorption (hard subcutaneous swelling), the infusion site should be renewed.

5.9.2 What to do if the infusion site fails during an infusion

- Stop the syringe pump and clamp the infusion set.
- Assess for suitable alternative site and insert a new Saf-T intima infusion set in an appropriate site. Further instruction on this within this protocol.
- Disconnect the infusion line from the tissued Saf-T intima and connect onto the newly inserted Saf-T intima.
- Remove tissued device and place in clinical waste.
- Unclamp infusion set
- Restart syringe driver as per procedure (APPENDIX 3).

5.9.3 Repeated infusion site problems

- Further dilute drug, if possible, e.g. into 30ml luer lock syringe
- Change type of site dressing
- Change infusion site more often
- Contact the Specialist Palliative Care Teams for advice, may need to consider addition of steroid or additional drivers in event of more than one drug.

5.9.4 Priming a new extension set (line) after the infusion has started and restarting

- **See APPENDIX 4 for full guidance**
- The time remaining for the infusion will decrease to compensate for the solution that was used priming the second line, the flow rate will remain the same. Plan next visit in time, as infusion may run out sooner; likely only few minutes at most.

5.10. Troubleshooting in case of syringe driver malfunction

See APPENDIX 5 for Syringe Driver full troubleshooting guide and checklist.

5.11. Incident management and reporting

- Assess the patient, ensure they are safe and contact the medical practitioner for guidance on safe patient care.
- Inform the line manager/on-call manager immediately
- Any syringe driver error or incident must be reported through the Datix incident reporting system.
- Faulty devices must be removed from practice, segregated, and clearly labelled. Sent to Scarborough Hospital Medical Engineering for check and repair.

5.12. Use of Mobile Telephones

Although there are no confirmed reports of mobile phones interfering with the operation of the syringe pump, following this advice will help reduce any potential risk[8]:

- Use a mobile phone 1 metre or more away from the driver, preferably on the opposite side to the syringe driver
- If the phone is left switched on it should be kept 1 metre away from the syringe driver.

5.13. Information for Patients

The following information should be discussed with the patient and carer/s:

- What is a syringe driver?
- Why do I need a syringe driver?
- Where will the line be inserted?
- What do I need to know about the syringe driver
- The syringe pump lock box
- How to keep the system safe; e.g. not getting the machine wet, carrying in a provided pouch, mobile phone use
- Contact telephone numbers
- Patients and carer/s should be given the Trust Syringe Driver Patient Information Leaflet.

5.14. Management of Syringe driver after death of patient

Expected death:
Do not turn off or remove machine until death has been verified.
Once death is verified, turn keypad lock off, stop infusion and switch syringe driver off.
Record the amount remaining in the syringe and discard according to Trust protocol; in community into sharps bin.

Unexpected death/death being reported to Coroner: Leave the syringe driver in situ, but to stop the infusion. Ensure that all the professionals dealing with the body are aware the syringe pump is still in situ.

Complete after death care plan and Datix.

5.15. Care of the Syringe Driver returned from patient

- Turn off driver
- Leave the battery in situ.
- Wipe clean the external surfaces of the Syringe driver as per Cleaning and Disinfecting of Equipment and Medical DevicesPolicy.
- Return the syringe driver to its box and plastic container and return to its allocated base.
- Complete the log book on return to confirm cleaning
- Dispose of any medication no longer required in accordance with the Safe and SecureHandling of Medicines Procedures and the Misuse of Drugs Act 1971.
- All disposable equipment should be disposed of as per the Waste Management Policy.

6. RESPONSIBILITIES

All registered nursing staff are personally responsible and accountable to ensure they receive training in the safe use and observation of any medical devices they need to use [2].

The manager is responsible for monitoring the use and training of the syringe driver in line with the Statutory and Mandatory Training Policy.

The clinical managers and matrons are responsible for providing and ensuring that all staffusing medical devices are appropriately trained [1].

Clinical managers should ensure, at annual appraisal, relevant registered staff meet practiceand competency assessments requirements as outlined in the training section.

Clinical staff are responsible for ensuring that all syringe drivers are appropriately serviced.The trust is responsible for ensuring a contract for servicing is in place.

All staff are responsible for reporting patient safety incidents via Datix.

7. TRAINING

Using any syringe driver without relevant training is not permitted under any circumstances.

All registered nurses are accountable for their practice, for ensuring that they undertake the appropriate training to carry out this procedure and that they maintain their competence in accordance with the NMC Code (2018)[2] Also in accordance with Royal Pharmaceutical Society [9] and, in the case of Nursing Associates, Health Education England guidance [10]:

Novice Registered Nurse, not competent in use of syringe drivers will be required to access face-to-face or live video training followed by a period of one-to-one supervision and competency assessment with an appropriately trained and competent practitioner, for example, specialist community nurse, matron or clinical lead. Full details of education, training and competency framework see **APPENDIX 6.**

Competent staff are required to compete an annual self-assessment of competency. In case of any skills or knowledge gaps to discuss with manager / clinical lead and complete further training and one-to-one supervision as required.

8. IMPLEMENTATION

This procedure will be disseminated by the method described in the Document Control Policy.

Implementation of this procedure will be overseen by the Physical Health Group which is asubgroup of Trust's Quality and Patient Safety Group.

9. REFERENCES/EVIDENCE/GLOSSARY/DEFINITIONS

1. MHRA directive (2021) Infusion pumps: T34 syringe drivers - GOV.UK (www.gov.uk)
2. Nursing & Midwifery Council (2018) The Code: Professional standards of practice and behaviour for nurses, midwives, and nursing associates
3. British Pain Society (2012) **Use of medicines outside of their UK marketing authorisation in pain management and palliative medicine:** British Pain Society in consultation with the Association for Palliative Medicine of Great Britain and Ireland.
4. Department of Health (2010) Mixing Of Medicines Prior To Administration In Clinical Practice: Medical And Non-Medical Prescribing - GOV.UK (www.gov.uk)
5. NHS England. Yorkshire and the Humber End of Life Care Group (2019) A Guide to Symptom Management in Palliative Care. Version 7. A Guide to Symptom Management in Palliative Care (yorkhospitals.nhs.uk)
6. NHS Scotland and Healthcare Improvement Scotland. Scottish Palliative Care Guidelines (on-line) Scottish Palliative Care Guidelines - Syringe Pumps
7. Dawkins, L., Britton, D., Johnson, I., Higgins, B. and Dean, T. (2000) A randomized trial of winged Vialon cannulae and metal butterfly needles. International Journal of Palliative Nursing. 6(3), p.110-116
8. Safe mobile phone use (2019) https://www.palliativecareguidelines.scot.nhs.uk/media/71245/2019-cme-t34-guidelines.pdf
9. Royal Pharmaceutical Society (2019) Professional guidance on the safe and secure handling of medicines
10. Health Education England (2019) Advisory guidance on administration of medicines by nursing associates
11. BD Saf-T-Intima product information MMS-IV-BD-M0195-Saf-T-Intima-Sub-Q-Sales-Brochure_CA_EN_BR.pdf

Other reading and resources:

- Dickman. A, and Schneider. J (2016) The Syringe driver, Continuous subcutaneousinfusions in palliative care, 4th edition . London: Oxford University Press.

Abbreviations:

CSCI	Continuous Sub-Cutaneous Infusion
EPaCCS	Electronic Palliative Care Coordination System
Hrs	Hours
INFO	Information

LCD	Liquid Crystal Display
LED	Light Emitting Diode
MHRA	Medicines and Healthcare Regulatory Agency
PGD	Patient Group Direction
PRN	Pro re nata means “as required”
SC	Subcutaneous
SPCT	Specialist Palliative Care Team
VTBI	Volume to be infused
WFI	Water for Injection

10. RELEVANT POLICIES/PROCEDURES/PROTOCOLS/GUIDELINES

- Medicines Optimisation Policy
- Consent to assessment, examination and treatment policy and procedure
- Mental Capacity and Best Interest Decision Making Policy
- Electronic Palliative Care Co-ordination System (EPaCCS) SOP V 2.0
- Reporting of adverse incidents policy and procedure
- Policy for medical and non-medical devices and equipment of high cost/volume for usein patient areas management and procurement
- Corporate Statutory and Mandatory Training Policy
- Safe and Secure Handling of Medicines Procedure
- Hand Hygiene Policy
- Standard Precautions Policy
- Waste Management Policy

APPENDIX 1 - MEDICATION AND PRESCRIBING RESOURCES & SUPPORT

1.) **NHS England: Yorkshire and the Humber End of Life Care Group: A Guide to Symptom Management in Palliative Care (yorkhospitals.nhs.uk)**

This guide provides regionally agreed guidance on management on the commonest palliative symptoms and commonly used drugs

2.) **Scottish Palliative Care Guidelines - Syringe Pumps** [6]

This website provides information on all aspects of palliative care, including a comprehensive guide to compatibility and stability of a wide range of medication combinations in a syringe.

If uncertain or in the case of unfamiliar medications and combinations always contact specialist palliative care team for support:

Contact for further help & advice					
York Specialist Palliative Care Team (SPCT)			Scarborough Specialist Palliative Care Team (SPCT)		
In hours	Community SPCT	01904 777770	In hours	Community SPCT	01723 356043
	Hospital SPCT	01904 725835		Hospital SPCT	01723 342446
	St Leonards Hospice	01904 708553		St Catherine's Hospice	01723 351421
Out of hours	GP OOH	0300 1231 183	Out of hours	GP OOH	NHS 111
	St Leonards Hospice	01904 708553		St Catherine's PalCall	01723 354506

Other Resources:
See also BNF sections on "Controlled Drugs" and "Prescribing in Palliative Care" Check the BNF for formulations, dose recommendations, side effects and contra-indications.

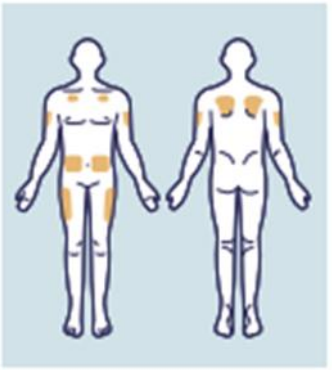
The latest version of: "The Palliative Care formulary (PCF)" Twycross R, and Wilcock A, Radcliffe Medical Press Ltd and website www.palliativedrugs.com

MedicinesComplete: www.medicinescomplete.com • www.evidence.nhs.uk

NICE website, www.nice.org.uk/guidance.

Symptom Management in EoLC for People with Dementia. Download at: https://tinyurl.com/yd89cgk

APPENDIX 2 - HOW AND WHERE TO INSERT INFUSION DEVICE



Infusion Sites to be avoided

- Bony prominences
- Joints and skin folds
- Sites of tumour
- Areas of broken skin
- Areas of inflammation or infection or radiation
- Areas where other medication patches are in place
- Areas of lymphoedema or ascites, absorption will be restricted and breaches in skinintegrity could increase risk of infection
- Tattooed areas – especially those with red inks
- The upper chest wall in very cachectic patients due to the risk of causing pneumothorax
- Skin which has been irradiated within the last two months
- Painful sites
- Bruised or scarred tissue
- Areas near breast tissue
- Areas near perineum

How to insert:

- Wash hands and don PPE
- Remove the needle cover on the BD Saf-T-Intima and inspect the unit.
- Make sure the eye of the needle is facing upwards
- Grasp the pebbled side of the wings, pinching firmly.
- Grasp the skin gently and insert the device at a 45 degree angle.
- Release the wings and secure with an occlusive clear film dressing.
- Gently hold the wings of the Saf-T-Intima place and grasp the white shield and pull in astraight continuous motion , the shield will come off, exposing the injectable bung adapter .
- Dispose of the retracted needle in the sharps bin.

For full product information and guidance see
MMS-IV-BD-M0195-Saf-T-Intima-Sub-Q-Sales-Brochure_CA_EN_BR.pdf [11]

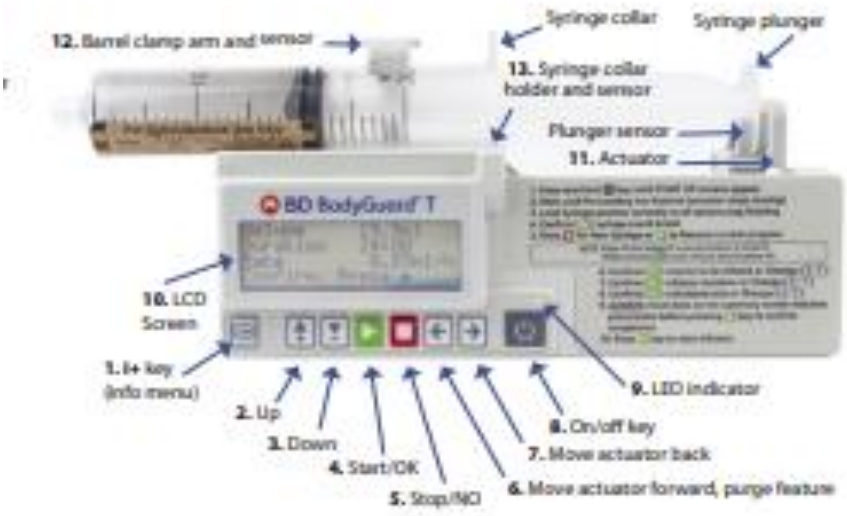
APPENDIX 3 - PROCEDURE: SET UP AND MANAGE SYRINGE DRIVERS

This guide is relevant for use with both McKinley T34 V3 and BD BodyGuard syringe drivers. Relevant keys for each model are included. Where these keys differ, both are given side by side.

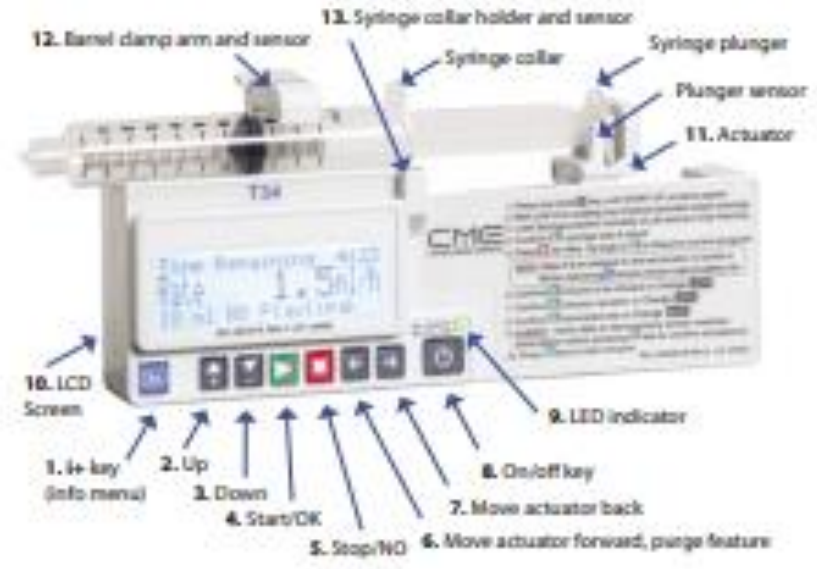
T34 V3 and BD BodyGuard T syringe driver features

Front of syringe drivers: Keys and display screens

BodyGuard™T
Front of pump: keys and display screen



T34™ (3rd edition)
Front of pump: keys and display screen



Keys and their function

T34™	BodyGuard™T	Function
		• repeated presses during infusion will display infusion summary and battery level • when pump paused, accesses the main (Info) menu • long press activates/deactivates keypad lock
		• scrolls between options
		• scrolls between options
		• confirms selection • starts infusion
		• stops infusion • takes user back a step during programming
		• moves actuator forward when no syringe is in place and the barrel clamp arm is down • accesses purge function • scrolls between options
		• moves actuator backward when no syringe is in place and barrel clamp arm is down • scrolls between options
		• powers the pump on and off
LED light	LED light	A green indicator lights: • during system self-test • intermittently (about every 30 seconds) to indicate infusion delivery A red indicator lights: • continuously to indicate an alarm state • when pump paused/on stand-by mode or stopped
LED screen	LED screen	• displays pump and infusion status, programming choices and instructions • backlight enabled when any key pressed
The actuator	The actuator	• moves the syringe plunger and contains a plunger sensor
Barrel clamp arm	Barrel clamp arm	• holds the syringe in place and contains a sensor
Syringe collar holder	Syringe collar holder	• holds the syringe collar in place and contains a sensor

The actuator, barrel clamp arm and syringe collar holder all contain sensors that provide information to:

- Ensure the syringe is in the correct position
- Sense the type and size of the syringe
- Calculate the infusion rate

THE BATTERY:

Use **PP9 Batteries:**

The following batteries can be used

WPA147	All batteries nx-power tech
WPA244	Duracell Plus
WPA156	Duracell Ultra

Using the incorrect battery can cause a number of issues including end of battery messages during pre-loading, volume test fails, pressure test/calibration issues and reduced number of infusions from the battery.

Backup battery depletion

If the internal backup battery has been depleted, the pump displays an alarm and requires you to enter the current date and time by following the directions on the screen.

For T34 press  or  and for BD BodyGuard press  or  to change date and time settings. To move to next screen press  or  to go back to the previous step.

Fitting the battery

- Slide open the compartment cover at the back of the syringe pump
- Push the battery into the compartment taking care to ensure that the +/- contacts are aligned as shown on the label inside the compartment
- Slide the cover back on.

When changing the battery during an infusion, stop the infusion and turn off the syringe pump before removing the battery.

Testing the battery

Always use a new battery when setting up a syringe pump, and in the community setting, at every syringe change. Please note, that if additional corrective action is required to a syringe driver, ie occlusion, a fresh battery will be required at this stage also.

1. Press 
2. Select **BATTERY LEVEL** from the menu and press 
3. Verify sufficient battery charge is available > 15% in hospital)
4. Change the battery if not sufficient.

Changing the battery mid infusion

1. Unlock the keypad, if applicable

2. Stop the infusion by pressing 

3. Turn the syringe pump off by holding down  

4. Replace the battery

5. Power up the syringe pump by pressing  

6. Press  to confirm syringe brand and size

7. Screen: Press  to **Resume** or  for **New Program**

8. Press  * to resume

* If you press NO the syringe pump interprets this as a completely new 24-hour period. Unless this is very close to the original start of the infusion, an new syringe will new to be drawn up and the process started again.

Press  to confirm **Volume, Duration** and **Rate**

Press  to re-commence infusion

SETTING UP AND COMMENCING A T34 V3 AND BD BODYGUARD SYRINGE DRIVER INFUSION WITH A NEW SYRINGE: A STEP-BY-STEP GUIDE

- This guide assumes that a Saf-T intima infusion device has already been inserted into the person.
- See APPENDIX 2 for infusion device insertion information and instruction.
- All volumes and rates shown in this step-by-step guide are examples only.
- This guide is relevant for use with both T34 V3 and BD BodyGuard syringe driver. Relevant keys for each pump are included side by side.

Equipment

Ensure that the equipment is prepared on a clinically clean receptacle or surface, and where possible, away from the patient's bedside.

- A Humber Teaching NHS Foundation Trust Syringe Driver.

Battery: A new nx-power tech, Duracell Plus or Duracell Ultra battery every time a new syringe driver is commenced.

  - Due to the short battery life, always ensure a spare is readily available.
  - Change battery at every syringe change in the community, and ensure above 15% in an inpatient setting.

- Used batteries must be discarded.

- BD Saf-T-Intima needle safe infusion device. See APPENDIX 2 for insertion guidance.
- Appropriate extension set no longer than 100cms
- Sterile blunt filter or fill needles for drawing up medication
- Syringe driver lockable box
- Syringe driver bag
- Gloves (latex-free if the patient has a latex allergy)
- 20 or 30mL Luer-lock BD Plastipak or Braun Omnifix syringe depending on volume required
- Clear film occlusive dressing
- Drug additive yellow label
- Medications prescribed and supplied
- Correctly recorded and signed drug administration chart
- Appropriate compatible diluent
- Sharps bin

This is a clean procedure; hands must be decontaminated in accordance with the Trust's Hand Hygiene Policy.

Procedure for setup

1. **Wash hands**

2. **Prepare and label syringe** with correct medication and diluent for loading as per local policy. CAUTION DO NOT attach extension set to the subcutaneous cannula yet.

3. **Turn on the syringe pump**

➢ Press   wait for the actuator to complete its automatic movement sequence

In BD BodyGuard only: if the syringe pump has not been used for several weeks, you may be prompted to reset the date and time before pump will pre-load.

Follow the on-screen prompts, then press 

➢ Screen: **"PRE-LOADING"** until actuator stops

➢ Screen: **"LOAD SYRINGE"**

- Using the syringe as a guide, adjust the position of the actuator after it stops moving by pressing either   OR   to align syringe collar to the collar sensor and the plunger sensor to the syringe plunger

CAUTION DO NOT use force to try to move the actuator manually as this could damage the device.

4. Load the syringe

- Lift the barrel clamp arm gently as far as it goes, turn the arm 180° and slowly lower it to the down position
- Load the syringe into the pump ensuring the syringe collar is sitting vertically in the collar sensor and the syringe plunger is centred in the plunger sensor
- Lift and turn the barrel clamp arm to hold the syringe in place
- Check the position of the syringe in the three sensors to ensure the syringe has remained in position
- Select the syringe brand using   or   keys, then press  when the correct brand is displayed

5. Review infusion settings

- Check and review data on screen: **Volume, Duration, Rate**
- Confirm settings by pressing 
    - Screen: "**START INFUSION?"**

CAUTION DO NOT commence infusion as the extension set must be primed first

6. **Attach the extension set**. Only one end of the extension set can correctly connect to the syringe.

7. Prime extension set tubing

8. Reconfirm syringe brand

- Re-select correct brand of syringe
- Press  to resume

9. Confirm infusion data after priming

- Screen: "**VOLUME"** (e.g.15ml) "**DURATION"** (e.g. 24 hrs) "**RATE"** will remain constant (e.g. 0.63 ml/hr)

- Check that all information on the summary screen is correct and matches the medicines order
- Confirm by pressing 
- Screen: "**START INFUSION?"**

10. **Take the pump to the person's bedside**.

- Wash hands again and don PPE as required
- Remove the cap from the end of the extension set and connect it to person via the Saf-T-intima device
- Screen: "**START INFUSION?"**
- Press 

The pump will now begin delivering the medicine to the person.

Screen during infusion

- Whilst infusing, the screen shows key infusion parameters including; Time remaining of infusion, infusion rate and syringe brand and size
- The delivery of medicine is indicated by a display message **"<<<Pump Delivering"** and a green LED light on the keypad that flashes approximately once every 30 seconds

11. Activate the keypad lock

- Press and hold   until a bar is displayed moving from left to right
- Hold   down until the bar has moved completely across the screen and a beep sounds to confirm the lock has been activated
- For safety,  can still be activated when the keypad is in locked mode

* If you press  , press  to restart the pump again if required.

12. **Place the syringe pump in the lockbox,** lock it with the key and then place it in a pouch or holster if needed

13. **Complete documentation according to local policy and procedures**

14. **Monitor the infusion and pump over time**

This step is completed while the syringe is in the lockbox.

When required:

- Check the screen to confirm:

- the syringe pump is still running at the same infusion rate as originally set
- Check the screen is intermittently showing the" **<<< Pump delivering**" and syringe information animation
- Check for signs of physical damage to the syringe pump and accessories

➢ Press  once to check Volume to Be Infused (VTBI) and Volume Infused (VI). The syringe graphic shows VTBI and VI in graphical form

➢ Press  twice to check for battery life remaining shown as a percentage and in graphical form on the screen.

* The syringe pump will alert/alarm to indicate if there is a need to replace the battery.

15. Subsequent infusions

When a syringe is nearly empty,

the pump will sound an alert 15 minutes and 7 minutes and before the syringe will be empty,

Screen: "**Program Nearly Complete"**

When a syringe has emptied,

the syringe pump will stop automatically when the syringe is empty, and an alarm will sound.

➢ Turn keypad lock off. Hold  down until the bar has moved completely across the screen and a beep sounds to confirm the lock has been deactivated

➢ Screen: "**End Program PRESS 'YES' to confirm"** Press 

➢ Press and hold  to turn the pump off

➢ Unlock the lockbox and remove the pump

➢ Remove the empty syringe from the pump with the extension set attached

➢ Turn the syringe pump on by holding 

➢ Load a new filled and labelled syringe into the pump.

CAUTION DO NOT start the infusion yet.

➢ Disconnect the extension set from the empty syringe and attach it to the new syringe loaded in the syringe pump

IMPORTANT: In the case of any change to medications or doses a new extension set must be primed and used

➢ Press  to start the infusion

➢ Once running, lock the keypad, put the syringe pump in the lockbox and lock it.

ALERTS AND ALARMS

Alerts: an alarm will sound intermittently; the infusion will continue and a message will appear on the display screen indicating the cause. This message then alternates with the **Infusion Running** screen.
Alarms: an alarm will sound continuously, the infusion will stop, the LED light turns red, and a message appears on the screen indicating the cause

Screen	Description	Implication/Action
Press YES to resume NO for new syringe	**Alarm:** Something has occurred which has interrupted the current program (e.g. syringe displaced /battery failure) so the device is prompting the user to check the pump.	Pressing ▶▶ will continue the current, interrupted infusion. Check/confirm infusion summary screens and press ▶▶ to restart current infusion. Pressing ■■ will program a new infusion, e.g. new syringe. The pump will calculate the volume of the syringe and, based on duration required, will start a new program.
Pump paused too long	If the device is left idle in set up mode for more than two minutes, an alarm will sound.	Press ▶▶ to return to the screen you were on.
Pump paused too long	**Alarm:** Pump has been left in ■■ mode (on hold) for 2 minutes.	Either restart the infusion, continue pause or turn the pump off.
Low battery	**Alert:** Battery is almost depleted.	Prepare to change battery.
Program nearly complete	**Alert:** Infusion will end soon.	Prepare to change syringe or turn pump off.
End battery	**Alarm:** Battery is depleted.	Change battery.
End program	**Alarm:** Infusion is complete.	Close down or start new infusion.
Check syringe loaded correctly	**Alarm:** One or more of the syringe detection sensors is not detecting the correct placement of syringe.	Check the syringe and realign it as necessary.
Occlusion/ syringe empty Check line & syringe Press YES to confirm	**Alarm:** • Patient access device blocked • Clamp on the infusion line • Tubing occluded • Pump has reached the minimum travel position.	• Flush or replace device • Release the clamp • Clear the occlusion • Turn pump off.
System error. Press and hold INFO for details. If problem persists send pump for service	**Alarm:** System error.	Pressing ⓘⓘ will display the reason for the alarm and give advice if applicable. If correction not possible: • Remove pump from use and turn power off • Follow your local policy and procedures to return the pump for servicing • Include an explanatory note of the error code, and a brief description of the problem.
For BodyGuard™T only Time & Date Incorrect date/time Press ▶ to restore	The internal backup battery has been depleted and date/time values have been reset.	Press ▶, then enter current date and time.

APPENDIX 4 - STOPPING A SYRINGE DRIVER AND PRIMING A NEW INFUSION SET AFTER THE INFUSION HAS STARTED

- Stop the driver, disable the keypad lock. Do not switch off the pump.
- Disconnect the existing infusion set and Saf-T (if necessary).
- Remove the syringe from the pump.
- Attach and prime a new infusion set and insert a new Saf-T (if had to change site).
- Resize the actuator and place the syringe in the pump.
- Confirm the syringe make and size is still correct.
- Connect the new infusion set to a new Saf-T intima, if needed, or connect to the existing device.
- Restart the infusion as per **APPENDIX 3**

The time remaining for the infusion will decrease to compensate for the solution that was used priming the second line, the flow rate will remain the same.

APPENDIX 5 - SYRINGE DRIVER TROUBLESHOOTING GUIDE AND CHECKLIST.

Assess the patient and contact the medical practitioner for guidance on safe patient care. Report the incident as per the Reporting of Adverse Incidents policy. Inform the line manager/on-call manager immediately

- Check syringe is secured properly on syringe driver
- Check infusion rate
- Check battery working, using the function keys of the McKinley Bodyguard T34 syringe driver
- Check start function has been commenced
- Check position of syringe driver – may be positioned too low
- Check the Event Log function on the McKinley Bodyguard T34 syringe driver

If a syringe driver infusion runs through too quickly (more than one hours ahead of expected time)

- Turn off syringe driver
- Assess patient for signs of toxicity and report to medical practitioner immediately
- Check record sheet to confirm volume in syringe and time commenced
- Check infusion rate
- Check position of syringe driver – may be positioned too high
- Check for disconnection of line or needle.
- Check syringe securely attached to pump.
- Check no air present in syringe (solution will siphon in if barrel cracked).
- Check the correct syringe brand or size has been selected
- Check the Event Log function on the syringe driver
- Exchange syringe driver for another driver and set up as per this protocol
- report to nurse in charge
- appropriately label faulty driver with the cause for concern, for servicing.
- Keep a record of the asset number.
- Return to Medical Engineering at Scarborough Hospital for repair and servicing
- Complete the incident report via Datix.

If a syringe driver infusion too slow or stopped (running more than one hour behind expected time):

- Check the rate setting is correct.
- Check the syringe pump light is GREEN and flashing.
- Check the battery level.
- Check the rate setting is correct.
- Check connections intact.
- Check the correct syringe brand or size has been selected.
- Check that syringe is inserted correctly into syringe pump (Is the moveable actuator still against plunger?)
- Ascertain if syringe pump has been stopped and restarted for any reason.
- Check the time remaining on the infusion to ensure that the pump has not been accidentally reset to 24 hours by pressing ‘no’ for new programme, rather than ‘ yes’ to resume
- Check contents of syringe and line – are there any evidence of crystallization / kinking of tubing?
- Check needle site – is this red/hard/lumpy/sore?
- Change needle site if necessary.
- Consider further dilution of drugs to minimise irritation by setting up a fresh syringe.
- If syringe pump continues to run through too slowly, change entire pump and send for servicing.
- Check rate of infusion at regular intervals.
- Complete the incident report via Datix

APPENDIX 6 - EDUCATIONAL REQUIREMENTS

Novice in of syringe drivers, discuss and plan learning requirements with line manager. To gain competency all registered nurses must complete the following:

- Complete real-time video or face to face training. Via ECHO training team.
    - 2 sessions to be completed: 1) Practical session to introduce the syringe driver device, and 2) PRN medication in end of life and palliative care
    - Details of local training dates on local training programme. Contact ECHO team via ProjectECHOTeam@stleonardshospice.nhs.uk for dates and booking place
- Complete Syringe Driver Clinical Skill Competency alongside suitably competent clinical supervisor.
- Must complete the above, demonstrating competency to at least to level 3 before independently use of a syringe driver.

Annual competence must be confirmed by completion of Syringe Driver Clinical Skill Competency Self-Assessment yearly. In case of concern discuss immediately with line manager to develop an appropriate competency training support plan. Do not continue to use any syringe driver independently if competence is uncertain.

See Clinical Competency on intranet for further details:

CRS13 - Syringe Driver - Competency Assessment.pdf (humber.nhs.uk)

CRS13 - Syringe Driver - Guidance for Assessors.pdf (humber.nhs.uk)

APPENDIX 7 - KEY CHANGES FROM MCKINLEY T34 V2 TO BD BODYGUARD T AND THE MCKINLEY T34 V3 (WITH BODYGUARD SOFTWARE UPGRADE) MODELS. POWER POINT SLIDE SUMMARY

Syringe Driver Replacement Programme June 2022.

Humber Teaching NHS Foundation Trust

New Bodyguard / T34 V3: KEY CHANGES

MUST BE READ and UNDERSTOOD BEFORE USE

- Alarm function 15 minutes before end of infusion
- New alarm sounds
- Rear drain changed to avoid fluid accumulation in case machine gets wet
- LED screen
  - green- information alarm/signal
  - Yellow- low priority alarm/signal
  - Red- high priority alarm/signal
- Key pad has **universal symbols-** No words
- **Battery must be kept in situ at all times,** even when SD not in use. Internal clock battery will eventually run out without backup.
- **Batteries. Only use**: WPA147 nx-power tech, WPA244 Duracell Plus, or WPA156 Duracell Ultra
- Bolus option NOT available **Not to be used for patients under care of Humber Teaching Foundation NHS Trust**

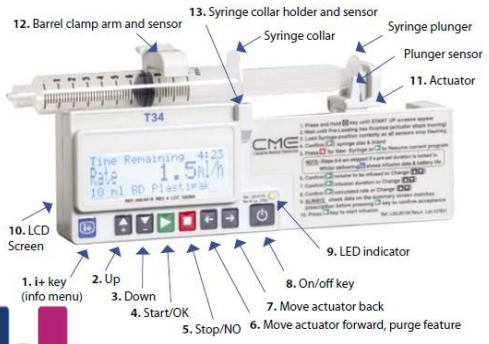
Caring, Learning & Growing Together

REMEMBER!! Check you have correct syringe driver before use

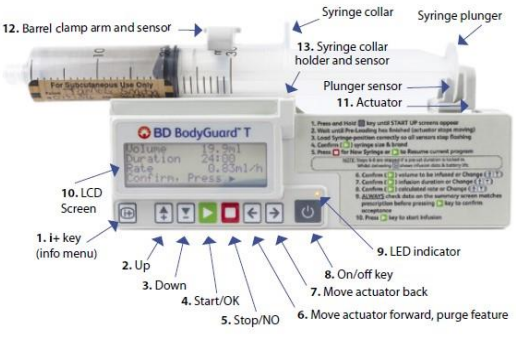
Humber Teaching NHS Foundation Trust

BD BodyGuard T or McKinely T34 V3 (software BD bodyguard)

T34™ (3rd edition)
Front of pump: keys and display screen



BodyGuard™T
Front of pump: keys and display screen



Caring, Learning & Growing Together

ALWAYS complete syringe driver store log book before use and on return of machine.

Ensure timely servicing: Scarborough Hospital Medical Engineering.