

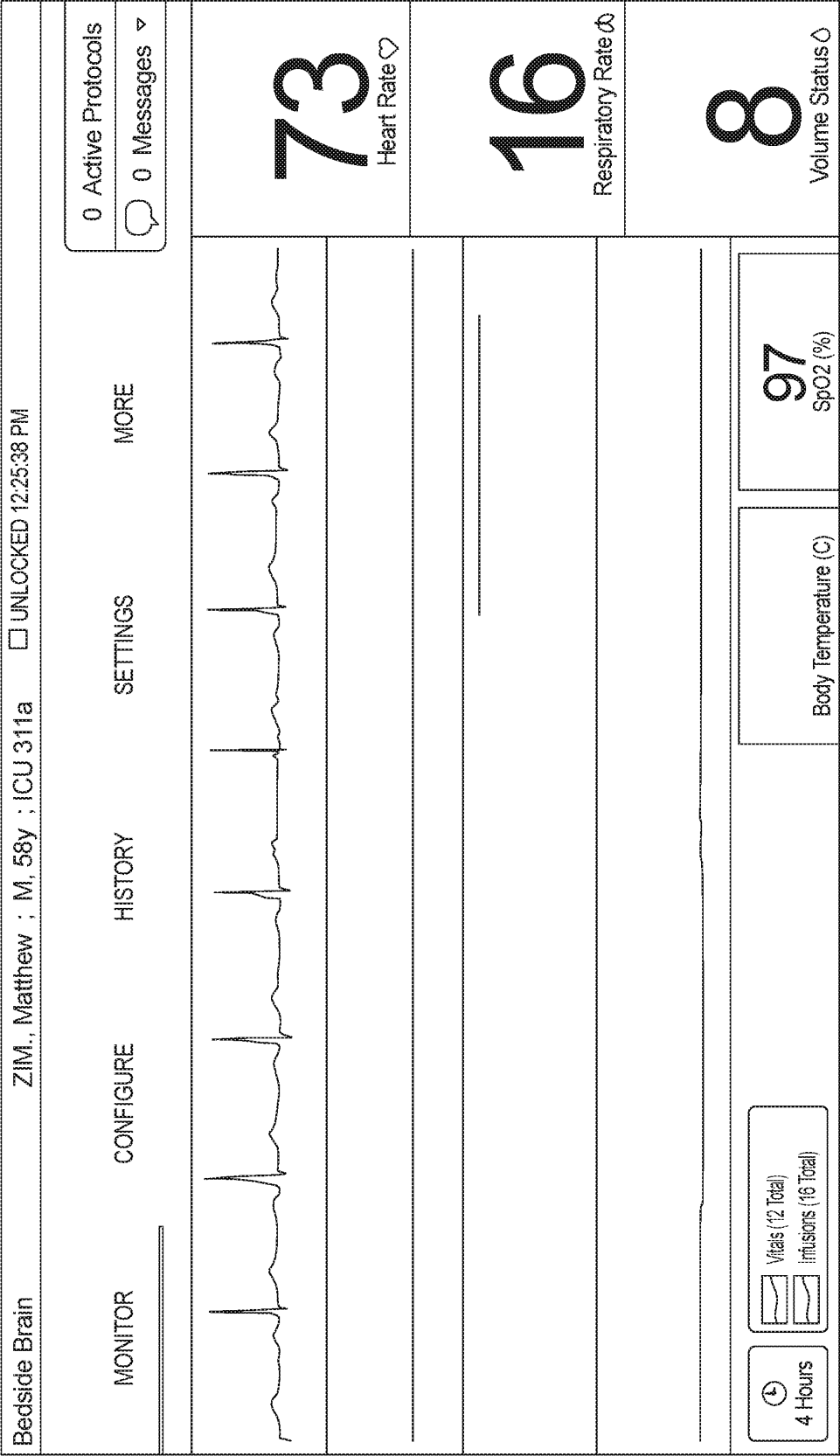


FIG. 2

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 1:01:55 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Suspended)

Full Protocol

Protocol

Status

Hypervolemia

Not Running (Suspended)

Hypoventilation with narcotics

Not Running (Missing Reqs)

Hypovolemia

Not Running (Suspended)

Infiltration

Not Running (Missing Reqs)

Magnesium infusion

Not Running (Missing Reqs)

SUMMARY

SETUP & ACTIVATION

Summary

Description

Potential Automatic Safety Actions (1)

Requirements

Required Inputs (1)

Parameter

Source

AUTOMATICALLY BOLUS the rehydration infusion
StartBolus - InfusionPump or SyringePump with Normal Saline or Lactated Ringers or D5 Lactated Ringers

For patients at risk of hypovolemia who have are getting rehydration IV fluid (like NS or LR), if volume status is mildly low (below configured value) then show warning message on screen. If volume status is very low, then bolus the rehydration IV fluid.

FIG. 3

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 3:19:36 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Full Protocol

Full Protocol - Hypovolemia

#1 of 3

When:
Volume index is severely low

Do
AUTOMATICALLY BOLUS the rehydration infusion

#2 of 3

When:
NOT Volume index is severely low
+ Volume index is mildly low

Do
Show warning on BSB of hypovolemia.

#3 of 3

When:
NOT Volume index is severely low
+ NOT Volume index is mildly low

Do
Nothing

any other reason that a hard bolus would be dangerous?

Therapy device not connected: InfusionPump or SyringePump

Config item #6 is not valid

Request Activation

Viewing: Safety Protocols

Sort by:

Protocol	Status
Hyperkalemia	Not Running (Missing Reqs)
Hypervolemia	Not Running (Missing Reqs)
Hypoventilation with narcotics	Not Running (Missing Reqs)
Hypovolemia	Not Running (Missing Reqs)
Infiltration	Not Running (Missing Reqs)

is value

7

5 mL

250 mL

160 pounds

Yes

ure, ARDS, or

Yes

FIG. 4

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 3:49:18 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Missing Reqs)

Full Protocol

Protocol

Status

SUMMARY

SETUP & ACTIVATION

Hypotension

Not Running (Missing Reqs)

Required Inputs (1)

Parameter

Volume

Sensor - PIVA

Hypoventilation with narcotics

Not Running (Missing Reqs)

Required Therapeutic Devices (1)

Device

Assignment

Hypovolemia

Not Running (Missing Reqs)

InfusionPump or SyringePump with Normal Saline or Lactated Ringers or D5 Normal Saline or D5 Lactated Ringers

None detected

Infiltration

Not Running (Missing Reqs)

Magnesium infusion

Not Running (Missing Reqs)

Setup & Activation

Patient Settings

Common Settings (3)

FIG. 5

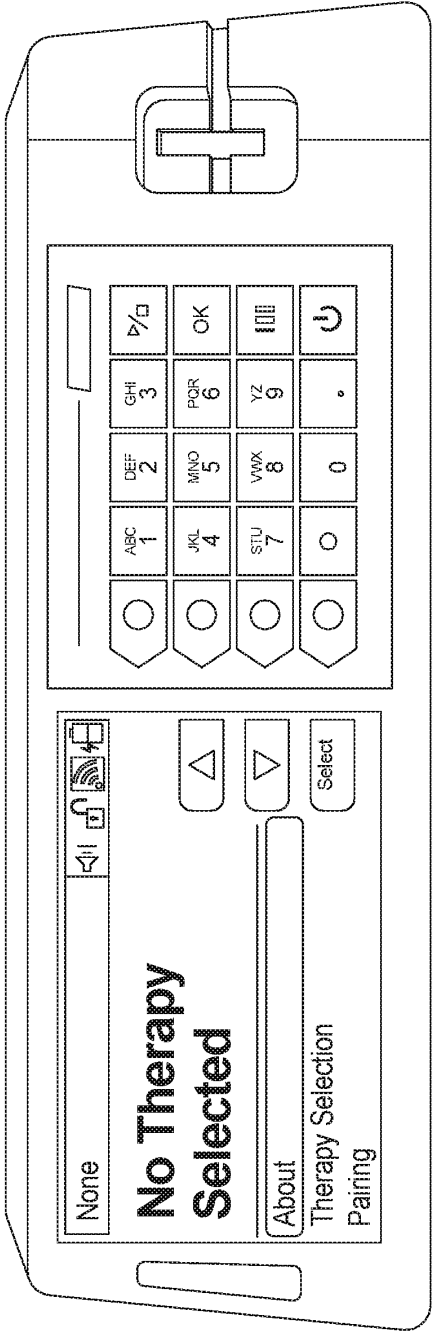


FIG. 6A

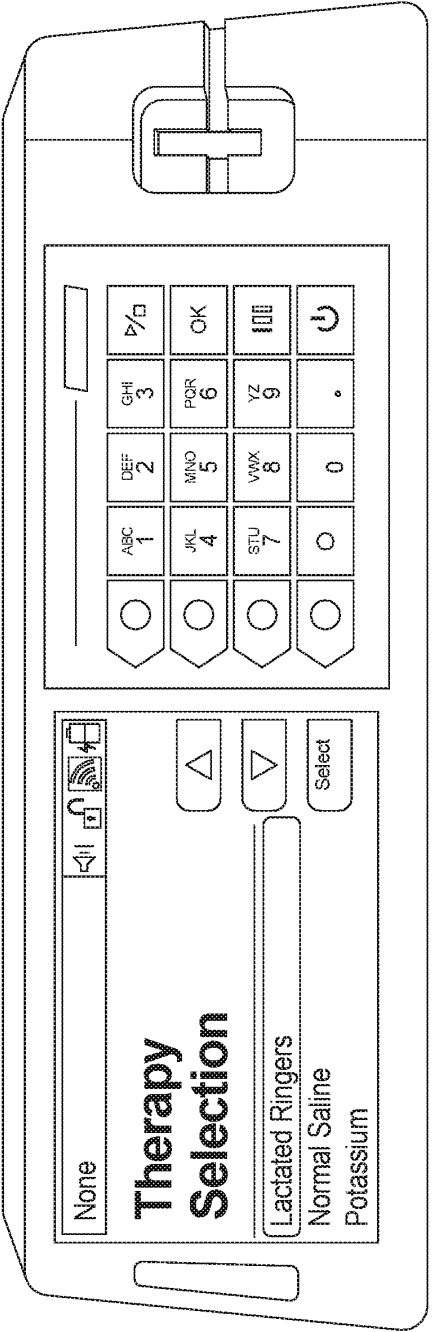


FIG. 6B

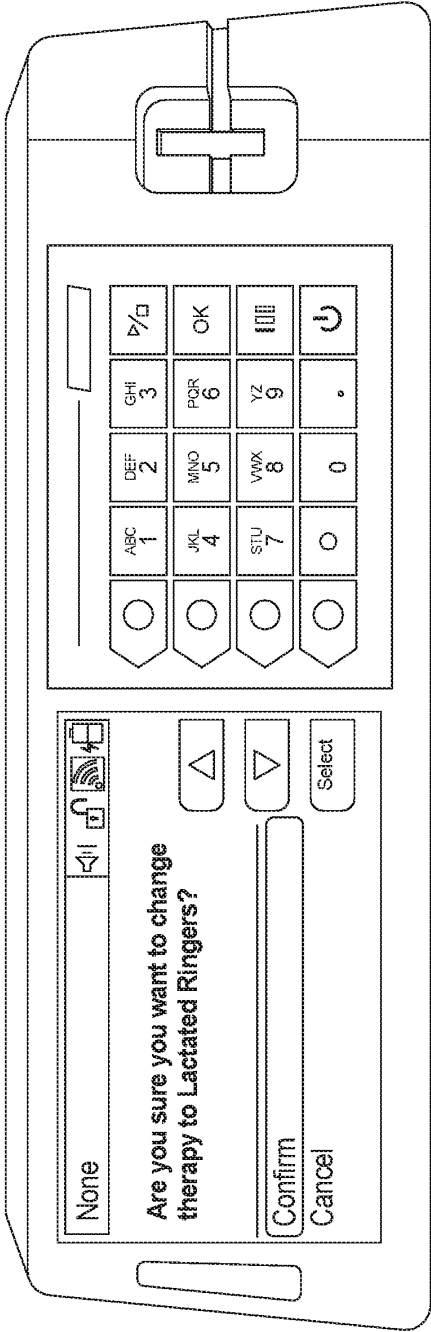


FIG. 6C

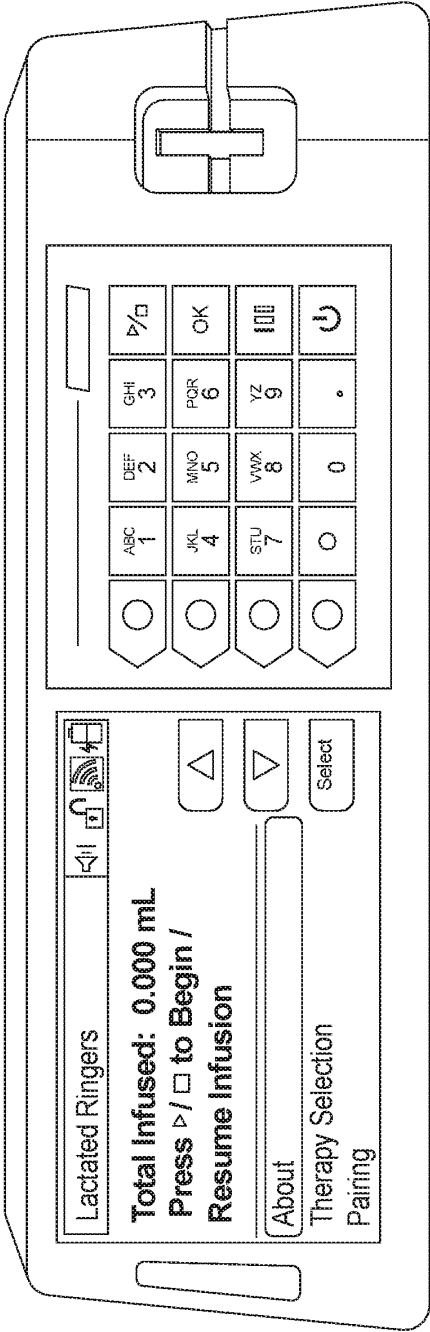


FIG. 6D

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 1:02:51 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Suspended)

Full Protocol

Protocol

Status

SUMMARY

SETUP & ACTIVATION

Potential Automatic Safety Actions (1)

AUTOMATICALLY BOLUS the rehydration infusion
StarBolus - InfusionPump or SyringePump with Normal Saline or Lactated Ringers or D5 Normal Saline or D5 Lactated Ringers

Requirements

Required Inputs (1)

Parameter

Source

Volume

Sensor - PIVA

Required Therapeutic Devices (1)

Device

Assignment

InfusionPump or SyringePump with Normal Saline or Lactated Ringers or D5 Normal Saline or D5 Lactated Ringers

IV - Pump I - Lactated Ringers

FIG. 7

Bedside Brain				ZIM., Matthew ; M, 58y ; ICU 311a	☐ LOCKED 1:03:25 PM
MONITOR		CONFIGURE	HISTORY	SETTINGS	MORE
					0 Active Protocols 0 Messages ▾

Viewing:
Safety Protocols

Sort by:

Protocol	Status
Hypovolemia	(Missing Reqs)
Hypervolemia	Not Running (Suspended)
Hypoventilation with narcotics	Not Running (Missing Reqs)
Hypovolemia	Not Running (Suspended)
Infiltration	Not Running (Missing Reqs)
Magnesium infusion	Not Running (Missing Reqs)

Hypovolemia

Not Running (Suspended)

[Full Protocol](#)

SUMMARY	SETUP & ACTIVATION
☒ Inusion Pump or Syringe Pump with Normal Saline or Lactated Ringers or D5 Normal Saline or D5 Lactated Ringers	IV - Pump I - Lactated Ringers

Setup & Activation Patient Settings

Common Settings (3)

- Protocol expires (auto-deactivates) in: 8 hours ✎
- Delay protocol start for: 30 minutes ✎
- Auto-execute therapy safety action only if I don't respond within: 120 seconds ✎

Protocol-Specific Settings (6)

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 2:43:04 PM

MONITOR

CONFIGURE

0 Active Protocols

0 Messages

Full Protocol

Auto-execute therapy safety action only if I don't respond within: 240 seconds

Value must be between 0 and 9999

1

2

3

4

5

6

7

8

9

Clear

0

120 (Default)

Cancel

Enter

Protocol-Specific Settings (6)

1. Required Show warning message on BSB screen when PIVA volume index falls below this value

7

Viewing: Safety Protocols

Sort by:

Protocol

Status

Hypervolemia

Not Running (Suspended)

Hypoventilation with narcotics

Not Running (Missing Reqs)

Hypovolemia

Not Running (Suspended)

Infiltration

Not Running (Missing Reqs)

Magnesium infusion

Not Running (Missing Reqs)

None detected

8 hours

30 minutes

120 seconds

FIG. 9

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 2:42:00 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Suspended)

SUMMARY

SETUP & ACTIVATION

Full Protocol

Protocol	Status
Hyperkalemia	Not Running (Missing Reqs)
Hypervolemia	Not Running (Missing Reqs)
Hypoventilation with narcotics	Not Running (Missing Reqs)
Hypovolemia	Not Running (Missing Reqs)
Infiltration	Not Running (Missing Reqs)

Protocol-Specific Settings (6)

1. Required

Show warning message on BSB screen when PIVA volume index falls below this value

7

2. Required

Bolus rehydration IV fluid when PIVA volume index falls below this value

5 mL

3. Required

Volume of rehydration fluid (in mL) to Bolus if severely hypovolemic

250 mL

4. Required

Weight of the patient in pounds (must be over 90 lbs)

160 pounds

5. Required

Is the patient over 18 years old and more than 90 pounds?

Yes

6. Required

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

Yes

Therapy device not connected: InfusionPump or SyringePump
Config item #6 is not valid

Request Activation

FIG. 10

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 3:32:51 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Suspended)

Full Protocol

Protocol

Status

Hyperkalemia

Not Running (Missing Reqs)

Hypervolemia

Not Running (Missing Reqs)

Hypoventilation with narcotics

Not Running (Missing Reqs)

Hypovolemia

Not Running (Missing Reqs)

Infiltration

Not Running (Missing Reqs)

SUMMARY

SETUP & ACTIVATION

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

Yes - Protocol Will Not Enable

Yes - Protocol Will Not Enable

No

1. Required

2. Required

3. Required

4. Required

5. Required

6. Required

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

Therapy device not connected: InfusionPump or SyringePump

Config item #6 is not valid

Request Activation

FIG. 11

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 4:24:51 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Not Running (Suspended)

Full Protocol

Protocol

Status

Hypoventilation with narcotics

Not Running (Missing Reqs)

Hypovolemia

Not Running (Suspended)

Infiltration

Not Running (Missing Reqs)

Magnesium infusion

Not Running (Missing Reqs)

OverHydration

Not Running (Missing Reqs)

SUMMARY

SETUP & ACTIVATION

1. Required

Show warning message on BSB screen when PIVA volume index falls below this value

7

2. Required

Bolus rehydration IV fluid when PIVA volume index falls below this value

5 mL

3. Required

Volume of rehydration fluid (in mL) to Bolus if severely hypovolemic

250 mL

4. Required

Weight of the patient in pounds (must be over 90 lbs)

160 pounds

5. Required

Is the patient over 18 years old and more than 90 pounds?

Yes

6. Required

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

No

Request Activation

FIG. 12

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 1:06:36 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Protocol	Status
Hyperkalemia	Not Running (Missing Reqs)
Hypervolemia	Not Running (Suspended)
Hypoventilation with narcotics	Not Running (Missing Reqs)
Hypovolemia	Not Running (Suspended)
Infiltration	Not Running (Missing Reqs)

Activating Protocol: Hypervolemia

Pre-approval on therapeutic devices is required.

By activating this protocol, the clinical user pre-authorizes the potential safety actions listed below as being not harmful to the patient, even if the system were to perform them inappropriately.

Please go to the following devices to approve pairing:

Device	Therapy
IV - Pump #1	Lactated Ringers

12

16

Cancel

Complete Activation

FIG. 13

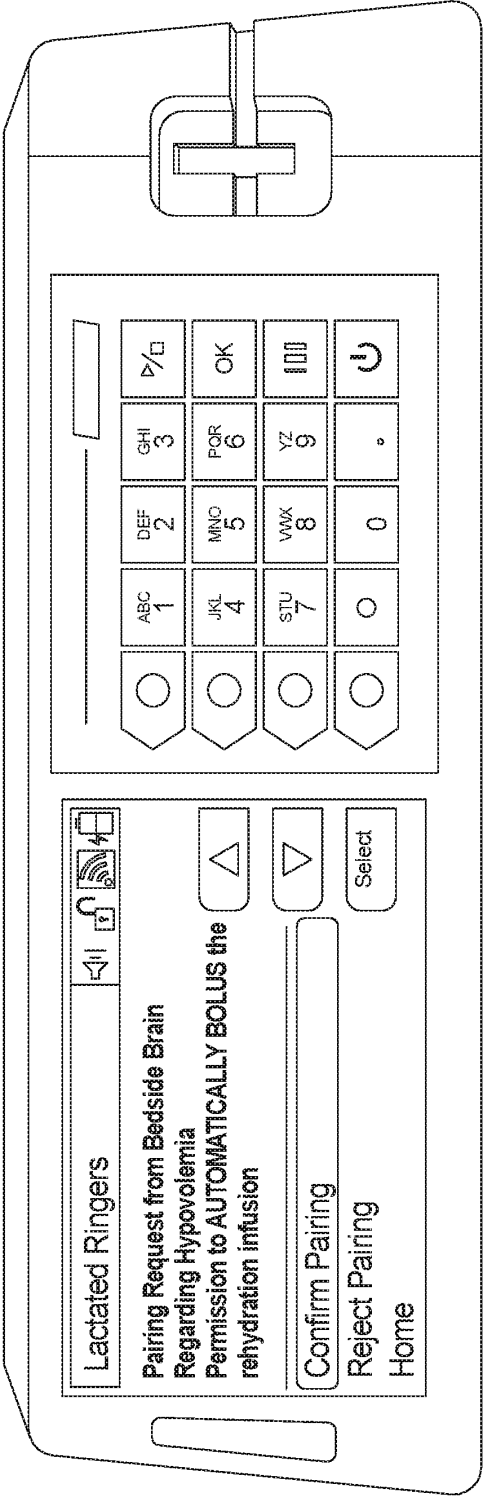


FIG. 14

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 4:56:12 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Protocol	Status
Hypoventilation with narcotics	Not Running (Missing Reqs)
Hypovolemia	Not Running (Suspended)
Infiltration	Not Running (Missing Reqs)
Magnesium infusion	Not Running (Missing Reqs)
OverHydration	Not Running (Missing Reqs)

Activating Protocol: Hypovolemia

Pre-approval on therapeutic devices is required.

By activating this protocol, the clinical user pre-authorizes the potential safety actions listed below as being not harmful to the patient, even if the system were to perform them inappropriately.

Please go to the following devices to approve pairing:

Device

✓ IV - Pump #1

Therapy

Lactated Ringers

Cancel

Complete Activation

FIG. 15

Bedside Brain

ZIM., Matthew ; M, 58y ; ICU 311a

☐ LOCKED 5:10:49 PM

MONITOR

CONFIGURE

HISTORY

SETTINGS

MORE

0 Active Protocols

0 Messages

Viewing: Safety Protocols

Sort by:

Hypovolemia

Running

Protocol

Status

Hypoventilation with narcotics

Not Running (Missing Reqs)

7

Hypovolemia

Running

5 mL

Infiltration

Not Running (Missing Reqs)

250 mL

Magnesium infusion

Not Running (Missing Reqs)

160 pounds

OverHydration

Not Running (Missing Reqs)

Yes

Deactivate Protocol

SUMMARY

SETUP & ACTIVATION

1. Required

Show warning message on BSB screen when PIVA volume index falls below this value

7

2. Required

Bolus rehydration IV fluid when PIVA volume index falls below this value

5 mL

3. Required

Volume of rehydration fluid (in mL) to Bolus if severely hypovolemic

250 mL

4. Required

Weight of the patient in pounds (must be over 90 lbs)

160 pounds

5. Required

Is the patient over 18 years old and more than 90 pounds?

Yes

6. Required

Does the patient have any of the following: heart failure, renal failure, liver failure, ARDS, or any other reason that a fluid bolus would be dangerous?

No

FIG. 16

Bedside Brain					ZIM., Matthew ; M, 58y ; ICU 311a					☐ LOCKED 5:13:16 PM				
MONITOR		CONFIGURE		HISTORY		SETTINGS		MORE		1 Active Protocol 0 Messages ▾				
										73 Heart Rate ♥				
										16 Respiratory Rate ♂				
										8 Volume Status ◊				
🕒 4 Hours Vitals (12 Total) Infusions (16 Total) Body Temperature (C) SpO2 (%)														

FIG. 17

Bedside Brain				ZIM., Matthew ; M, 58y ; ICU 311a				☐ LOCKED 5:14:49 PM			
MONITOR		CONFIGURE		HISTORY		SETTINGS		MORE		Active Protocol ▾	
										1 Messages Clear All	
								93 Heart Rate ♥		7 seconds ago Low Volume Warning! Consider giving rehydration fluid. Consistent volume for 1 minute (6.6) less_ than 7.0	
								18 Respiratory Rate ⌚			
								4 Volume Status ⬇️			
4 Hours		Vitals (12 Total) Infusions (16 Total)		Body Temperature (C)		SpO2 (%)					

Bedside Brain				ZIM., Matthew ; M, 58y ; ICU 311a	☐ LOCKED 5:17:05 PM
MONITOR		CONFIGURE	HISTORY	SETTINGS	MORE
 Vitals (12 Total)					
 Infusions (16 Total)					
 4 Hours					
 Body Temperature (C)					
 SpO2 (%)					
1 Safety Action Pause All Hypovolemia 111s until 1 automatic safety action 1 of 1: AUTOMATICALLY BOLUS the rehydration infusion <i>StartBolus - InfusionPump - Normal Saline</i> Cancel Perform Now ☒ What triggered this? Review Changes					
		93 Heart Rate ♥			
		18 Respiratory Rate ⬮			
		4 Volume Status ⬮			

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Bedside Brain ZIM., Matthew ; M, 58y ; ICU 311a ☐ LOCKED 5:24:24 PM

MONITOR	CONFIGURE	HISTORY	SETTINGS	MORE												
1 Safety Action Resume All Paused ▴ ▢ ▢ Hypovolemia 106s until 1 automatic safety action 1 of 1: AUTOMATICALLY BOLUS the rehydration infusion <i>StartBolus - InfusionPump - Normal Saline</i> Cancel Perform Now ☒ What triggered this? ☒ Review Changes																
Enter PIN to access ✕ • • • <table border="1" style="width: 100%; text-align: center;"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td>9</td></tr> <tr><td>Clear</td><td>0</td><td>Enter</td></tr> </table> Vitals (12 Total) infusions (16 Total) Body Temperature (C) SpO2 (%) Volume Status ◊					1	2	3	4	5	6	7	8	9	Clear	0	Enter
1	2	3														
4	5	6														
7	8	9														
Clear	0	Enter														

FIG. 20

Bedside Brain					ZIM., Matthew ; M, 58y ; ICU 311a	☐ LOCKED 5:25:23 PM
MONITOR		CONFIGURE	HISTORY	SETTINGS	MORE	
						1 Safety Action Resume All Paused ▴ Hypovolemia 106s until 1 automatic safety action 1 of 1: AUTOMATICALLY BOLUS the rehydration infusion <i>StartBolus - InfusionPump - Normal Saline</i> Cancel Perform Now What triggered this? Review Changes
						93 Heart Rate ♥
						18 Respiratory Rate ♀
						4 Volume Status ⬇
Vitals (12 Total) Infusions (16 Total)		Body Temperature (C)		SpO2 (%)		

125
G
F

Bedside Brain					ZIM., Matthew ; M, 58y ; ICU 311a					☐ LOCKED 9:43:17 PM				
MONITOR		CONFIGURE		HISTORY		SETTINGS		MORE		1 Safety Action				
Vitals (12 Total) Infusions (16 Total) 4 Hours								92 Heart Rate		Hypovolemia 1 action auto-executed by system. 2 minutes ago (9:41pm) ☒ 1 of 1: AUTOMATICALLY BOLUS the rehydration infusion StartBolus - InfusionPump - Normal Saline				
										Protocol suspended.				
										Deactivate				
										☐ What triggered this?				
								21 Respiratory Rate		3 Volume Status				
										Body Temperature (C)				
										SpO2 (%)				

FIG. 22

BSB Monitor Central				Showing: All Units		▽	
10 Patients with Emergent Notifications in "All Units" (8 not notified)							
Room	RN	Patient Name	Patient Info	Last Update	Rescues	Alerts/Alarms	Notified?
2S 213-2	Ratched M 692-2214	Stevens J	38y M	7s	Hypovolemia - 180s until: (1) Bolus 250 cc Normal Saline (2) Stop Magnesium infusion	Volume Status = 4 (Low) Heart Rate = 121 (High)	☐
2S 223-1	Smith P 692-2217	Peters M	84y F	3s		Heart Rate = 134 (High)	☐
2S 224-1	Smith P 692-2217	Jackson R	72y F	5s	Hypervolemia - 72s until: (1) Stop Lactated Ringers infusion	Volume Status = 16 (High)	☐
2S 225-2	Smith P 692-2217	Efram E	38y M	7s	Hypovolemia - 180s until: (1) Bolus 250 cc Normal Saline (2) Stop Magnesium infusion	Volume Status = 4 (Low) Heart Rate = 121 (High)	☐
2S 228-1	Smith P 692-2217	Traifaz K	84y F	3s		Heart Rate = 134 (High)	☐
2S 241-1	Smith P 692-2217	Smeisinberg J	72y F	5s	Hypervolemia - 72s until: (1) Stop Lactated Ringers infusion	Volume Status = 16 (High)	☐
2S 244-2	Ratched M 692-2214	Karnelsinsk... U	38y M	7s	Hypovolemia - 180s until: (1) Bolus 250 cc Normal Saline (2) Stop Magnesium infusion	Volume Status = 4 (Low) Heart Rate = 121 (High)	☐
							▽
SCROLL FOR 3 MORE (2 NOT NOTIFIED)							

Fig. 23