



Training Excellence

BeneVision N Series

Advanced User Guide

This page is intentionally blank

Document Purpose

This document contains information that provides guidance necessary to operate the BeneVision N series range of monitors in accordance with their function and intended use. The advanced user guide and the operator manual are provided as resources to enable the user to allow proper product performance, correct operation and patient / operator safety.

Intended Audience

The advanced user guide has been designed specifically for use by healthcare professionals who take responsibility for patient care when using the BeneVision patient monitoring system. The training information within this document is intended to be utilised in conjunction with a Mindray Clinical Training Programme. The programme aims to provide a 'hands on' experience with which delegates can develop advanced knowledge of the device features and clinical parameter management options.

Illustrations

The images and illustrations contained within this advanced user guide serve as examples only. They may not necessarily reflect the configuration and setup of the equipment used within an individual clinical environment.

Device Overview and Intended Use

The BeneVision N Series range of patient monitors (N22, N19, N17, N15, N12 & N1) are a touchscreen modular dependant family of devices which are intended to be used for the monitoring, displaying, reviewing, storing, alarming and transferring of multiple physiological patient parameters. The monitor is to be used in healthcare facilities by clinical professionals or under their guidance. It is not intended for helicopter transport, hospital ambulance or home use.

The following Mindray parameter modules are compatible with the system:









- N1
- T1
- MPM (multiparameter module)
- Benelink (device integration)
- Dual SpO₂ (arterial oxygen saturation from pulse oximetry)
- AGM (anaesthetic gas module)
- IBP (invasive blood pressure)
- Temperature
- Thermodilution C.O (cardiac output)
- PiCCO (pulse contour cardiac output)
- ScvO₂ (central venous oxygen saturation)
- NMT (neuromuscular transmission)
- CO₂ (carbon dioxide)
- BIS (bispectral index)
- RM (respiratory mechanics)
- EEG (electroencephalogram)
- INVOS (regional oximetry)

Contents

Safety	Page 7
General Operation	Page 9
Operating Modes	Page 13
Patient Management	Page 15
Alarm Management	Page 16
Parameter Monitoring	
ECG	Page 18
Respiration	Page 20
Temperature	Page 21
SpO ₂	Page 22
NIBP	Page 23
Invasive Blood Pressure	Page 25
CO ₂	Page 26
Review	Page 28
Printing	Page 31

This page is intentionally blank

SAFETY

ASSESSMENT	PERFORMANCE CRITERIA
<p>Safety Checks of the BeneVision N Series Monitor</p>	<p>Verifies:</p> <ul style="list-style-type: none"> • The equipment is clean • There are no visible signs of damage • All appropriate patient accessory cables are present, in correct working order and operating condition
<p>Identifies Mains Power is Connected and Switches the Monitor On or Off</p>	<p>Verifies:</p> <ul style="list-style-type: none"> • Mains lead is connected to the monitor • Mains plug is connected to the wall socket and switched on
<p>Understands the Purpose and Function of the Power LED Symbols and Button Functions</p>	<p>States Symbol & Button functions:</p> <p> Power Switch Press the power switch to turn the monitor on Press and hold the power switch to turn the monitor off</p> <p> AC Power Indicator AC power indicator illuminates when mains power is connected AC power indicator extinguishes when mains power is not connected</p> <p> Battery Indicator LED on front of monitor Yellow: Battery charging Green: Battery fully charged Flashing Green: Monitor operating on battery power Off: No battery installed Monitor off and no mains power being received</p>
<p>Explanation of Battery Operation and Onscreen Symbols</p>	<p>States:</p> <ul style="list-style-type: none"> • The monitor is designed to operate on battery power when mains power is not available • The battery indicator LED, on-screen battery icon and alarm messages indicate battery status <p> The battery works correctly. The green portion represents the remaining charge</p> <p> The battery has low power and needs to be charged</p> <p> The battery has critically low charge and need to be charged immediately, otherwise the monitor will soon automatically shut down</p> <p> The battery is being charged</p> <p> No battery is installed</p>

SAFETY

ASSESSMENT	PERFORMANCE CRITERIA
<p>Description of Battery Run times</p> <p>Typical configurations are 12 lead ECG, Resp, SpO₂, C.O, NIBP interval of 15 minutes, Wi-Fi enabled, screen brightness at default</p>	<p>Explained:</p> <ul style="list-style-type: none">• Monitor approximate run times based on a new fully charged battery used under optimal conditions: N19/N22 1 hour N17/N15 2 hours N12 4 hours N1 8 hours without internal CO₂ 3 hours with internal CO₂• When the battery has less than 15 minutes of power remaining, the battery symbol will flash while being accompanied by a LOW BATTERY alarm message being displayed on the screen. An audible alarm will also sound• If the battery is nearly depleted, a CRITICALLY LOW BATTERY message and alarm will also sound to indicate that the battery requires immediate charging• The internal monitor batteries will charge automatically whenever a monitor is connected to a mains supply <p>The N1 battery will charge when inserted into a host monitor, connected satellite module rack or dock when the host monitor is connected to mains power, switched on or in standby mode</p>

GENERAL OPERATION

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Removal and Fitting of the Parameter Modules



Removing the Module:

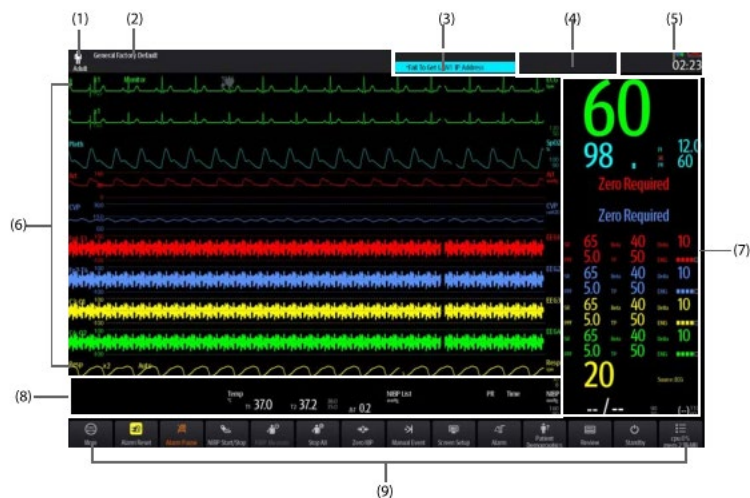
- Pushes the 2 tabs up underneath the module
- Pulls the module out

Fitting the Module:

- Pushes module in until a green light is lit on the module and a 'click' is heard
- Stores patient data on the module

Navigation and Layout of Normal Screen View

Understanding the function of the Normal Screen:



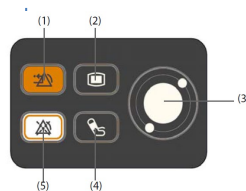
- (1) Patient information area: displays patient demographics
- (2) Current configuration
- (3) Technical alarm notification area
- (4) Physiological alarm notification area
- (5) System Information area: battery status, system time etc
- (6) Parameter Waveform display: touch a waveform to enter the relevant parameter menu
- (7) Parameter Numeric display area: touch a numeric to enter the relevant setup menu
- (8) Quick Keys: allow one touch access to individual device features

Understanding the Use of Input Devices

Explains:



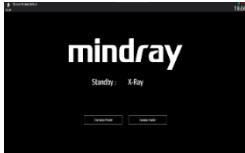
The monitor allows data entry through touchscreen, keyboard, mouse, remote controller and bar code reader.

A navigation panel may be installed on the N22 / N19.



- (1) Alarm Reset hard key
- (2) Main menu hard key
- (3) Navigation Dial
- (4) NIBP Start/Start hard key
- (5) Alarm Pause/ Audio Pause hard key

GENERAL OPERATION

ASSESSMENT	PERFORMANCE CRITERIA
<p>Utilising Standby Mode</p> 	<p>Demonstrates how to enter Standby Mode by selecting:</p> <ul style="list-style-type: none"> • Standby quick key <p>OR</p> <ul style="list-style-type: none"> • Main Menu quick key → selects Standby from the Patient Management column
<p>Using the Standby Drop-down Menu to Label Patient Location</p> 	<p>Demonstrates how to use Patient Location menu:</p> <ul style="list-style-type: none"> • Selects a patient location by touching the dropdown menu and choosing a department from the options listed • Press OK to confirm selection • Monitor will enter standby mode once actioned and patient location will be displayed on the screen
<p>Standby Mode Features</p> 	<p>States features of Standby Mode:</p> <ul style="list-style-type: none"> • Pauses all parameter monitoring • Disables all alarms and prompt messages (except for low battery alarm) • Monitor screen brightness is dimmed to lowest setting after 30 seconds • No further parameter data is acquired or saved at the bedside monitor or Central Monitoring System (CMS) • CMS displays STANDBY and patient location, if entered <p style="text-align: center;">STANDBY DOES NOT DISCHARGE A PATIENT</p> <p>Demonstrates how to change the patient Location whilst in Standby Mode by selecting:</p> <ul style="list-style-type: none"> • Location from the Standby screen. <p>Demonstrates how to exit Standby Mode by selecting:</p> <ul style="list-style-type: none"> • Resume Monitor to exit the Standby Mode and resume monitoring the current patient. <p>OR</p> <ul style="list-style-type: none"> • Discharge Patient to discharge the current patient. <p>OR</p> <ul style="list-style-type: none"> • New Patient to exit the Standby Mode and admit a new patient <p>States:</p> <ul style="list-style-type: none"> • The monitor automatically enters the Standby Mode after a patient is discharged • To exit the Standby Mode after a patient has been discharged select: <ul style="list-style-type: none"> • New Patient to exit the Standby Mode and admit a new patient <p>OR</p> <ul style="list-style-type: none"> • Pre Admit to enter the patient information for preparing to admit a new patient









GENERAL OPERATION

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Understanding Quick keys

Explains the functions of commonly used Quick keys:

Symbol	Label & Function	Symbol	Label & Function	Symbol	Label & Function
	Main Menu Enters the Main menu		More Shows more quick keys		Alarm Enters the Alarm menu
	Alarm Reset Acknowledges the ongoing alarms		Audio Pause Pauses alarm tone		Alarm Pause Pauses the current alarms
	Review Enters the review menu		Standby Enters the standby mode		Screen Setup Enters the screen setup menu
	Patient Demographics Enters the patient management menu		NIBP Start/Stop Starts and NIBP measurement or stops the current NIBP measurement		Stop All Stops all NIBP measurements
	NIBP Measure Enters the NIBP measure menu		Zero IBP Starts IBP zero calibration		Venepuncture Enters the venepuncture window
	Parameters Setup Enters the parameters setup window		Remote View Enters the remote view window		Manual Event Manually triggers and saves an event
	Minitrends Enters the minitrends screen		Privacy Mode Enters the privacy mode		Night Mode Enters the night mode
	Volume Enters the volume menu		Freeze Freezes displayed waveforms		Load Configuration Enters the load config. menu
	Print Starts printing a realtime report		Rotate Screen Changes the setting of screen orientation		

Symbol	Label & Function	Symbol	Label & Function	Symbol	Label & Function
	Call Help Calls for help		BoA Dashboard Enters BoA dashboard screen		EWS Enters the EWS screen
	SepsisSight Enters the SepsisSight menu		HemoSight Enters the HemoSight menu		Pace View Enters the Pace View window
	Rescue Mode Enters the Rescue mode		ECG 24hr Sum Views the 24h ECG summary		

GENERAL OPERATION

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Understanding the Menu Structure

Demonstrates the ability to navigate around menus:



- (1) Menu heading
- (2) Submenu tabs
- (3) Operation buttons
- (4) Exit button: closes the current menu page
- (5) Main body area: menu items & options
- (6) Option switch:
 - Green: option is Enabled
 - Grey: option is Disabled

Locking the Touchscreen



States:

To avoid misuse, the touchscreen can be temporarily disabled.

Demonstrates:

- Press and hold the **Main Menu** quick key → slide as directed by the arrow
- A padlock symbol is displayed in the **Main Menu** quick key and the touchscreen screen is disabled
- The touchscreen is enabled when the pre-set time is reached

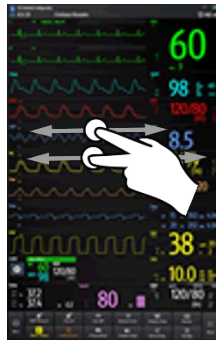
OPERATING MODES

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Changing Screen View

Demonstrates:

- Swipe left or right with two fingers to switch between screen views
- The monitor provides different user screens to facilitate patient monitoring in different departments and clinical applications



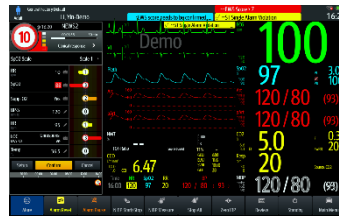
Normal Screen



Big Numerics



Mintrends



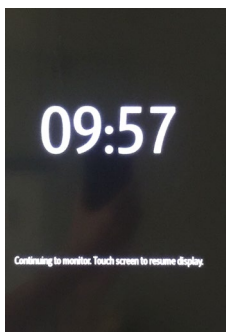
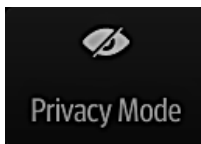
NEWS2



Neonatal SpO₂

Screen availability is dependent on configuration setup and patient category selected

Using Privacy Mode



Demonstrates how to enter Privacy Mode by selecting:

- Privacy Mode Quick Key → selects Ok when warning window appears
- OR
- Main Menu Quick Key → selects Privacy Mode from the display column → OK




States features of Privacy Mode:

- Available when the patient has been admitted to the system and the system is connected to a CMS
- A warning window appears
- The monitor screen turns blank and displays the current time and a status message
- All audible alarms are suppressed and the alarm light is deactivated at the monitor
- Patient parameter monitoring and alarms are presented at the CMS
- The CMS displays a Privacy Mode status message in the corresponding patient area
- Cannot enter the Privacy Mode if a low battery alarm occurs



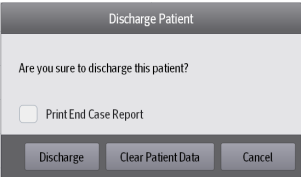
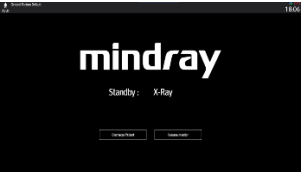


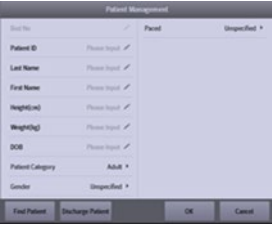
Demonstrates manually exiting from Privacy Mode:

- Touches screen to resume display
- OR
- Operates the keyboard or mouse





OPERATING MODES

ASSESSMENT	PERFORMANCE CRITERIA
<p>Entering and Exiting Night Mode</p> 	<p>Demonstrates how to enter Night Mode by selecting:</p> <ul style="list-style-type: none"> • Night Mode quick key <p>OR</p> <ul style="list-style-type: none"> • Main Menu quick key → selects Night Mode from the display column • Changes night mode settings as required in the Night Mode setup menu • Menu appears automatically when Night mode is selected • If no changes are required select Enter Night Mode <p>Demonstrates how to exit Night Mode by selecting:</p> <ul style="list-style-type: none"> • Night Mode quick key <p>OR</p> <ul style="list-style-type: none"> • Main Menu quick key → selects Night Mode from the Display column → OK
<p>Night Mode Settings</p> 	<p>Features of Night Mode menu:</p> <p>The following options can be changed in the night mode setting menu:</p> <ul style="list-style-type: none"> • Brightness • Alarm Volume • QRS Volume • Key Volume • NIBP End Tone • Stop NIBP <p>When a CMS is connected to a networked monitor it will display a Night Mode status message in the corresponding patient tile. The monitor will resume its previous setting when Night Mode is exited.</p>
<p>Entering and Exiting Remote View</p> 	<p>States:</p> <p>In the Remote View window, real time parameters and waveforms from one specific device can be viewed, and watch alarms (please refer to Operators Manual) of other networked devices can be monitored.</p> <p>Demonstrates entering the Remote View by one of the following ways:</p> <ul style="list-style-type: none"> • Selects Remote View quick key <p>OR</p> <ul style="list-style-type: none"> • Selects Screen Setup quick key → selects the Primary Display tab → selects the Choose Screen tab → selects Remote View <p>Demonstrates adding and removing a bed in Remote View:</p> <ul style="list-style-type: none"> • Select the Select Bed tab to enter the Select Bed window • Select a desired department → select a tile labelled A-W1, A-W2 or A-W3 → Select a bed from the available list • The selected bed will appear in the tile <p>To Remove a bed from Remote View:</p> <ul style="list-style-type: none"> • In the Select Bed window, select a bed at the A-W1, A-W2 or A-W3 areas → select Clear Bed OR Clear All Beds










PATIENT MANAGEMENT

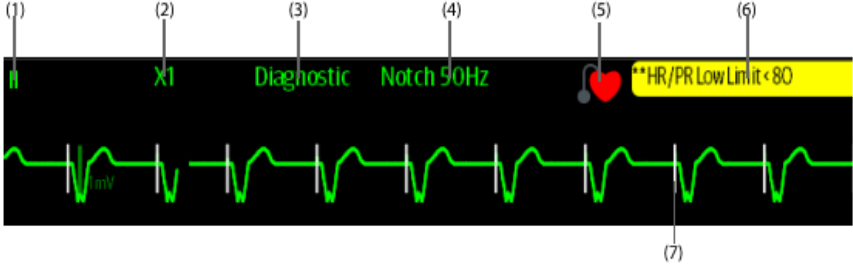





ASSESSMENT	PERFORMANCE CRITERIA
<p>Discharging a Patient</p>    	<p>States:</p> <ul style="list-style-type: none"> • Before admitting a new patient, discharge the previous patient • When discharging the previous patient, two screen options are available <p>Demonstrate discharging a patient by either:</p> <ul style="list-style-type: none"> • Swiping down the touchscreen with two fingers  <p>OR</p> <ul style="list-style-type: none"> • Selecting the Patient Management quick key → Discharge Patient <p>OR</p> <ul style="list-style-type: none"> • Selecting the Main Menu quick key → from the Patient Management column select Discharge <p>Selects an item from the Discharge Patient menu:</p> <ul style="list-style-type: none"> • Print End Case Report: discharges the patient and prints the end case report <p>OR</p> <ul style="list-style-type: none"> • Discharge: all patient data, including patient information and data is deleted. The monitor loads the default configuration and enters Standby Mode <p>OR</p> <ul style="list-style-type: none"> • Clear Patient Data: all patient data is deleted from the monitor and the current monitor settings are used • The Discharged screen appears
<p>Admitting a Patient</p>  	<p>Demonstrates admitting a new patient onto the monitor by:</p> <ul style="list-style-type: none"> • Selecting Patient Management on the Discharged screen • Entering patient details in Patient Management menu • Selecting OK <p>Demonstrates methods to edit patient information by:</p> <ul style="list-style-type: none"> • Selecting the patient information area at the top left corner of the screen • Selecting the Patient Management quick key • Selecting the Main Menu quick key → from the Patient Management column select Patient Management • Edit information as required • Select Ok to enable changes <p style="color: red;">The configuration will be reloaded if the patient category is changed</p>

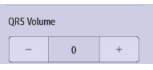





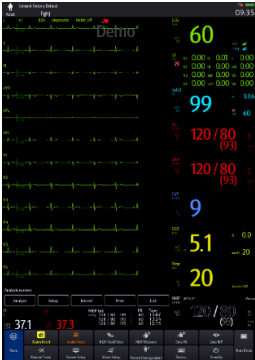
ALARM MANAGEMENT

ASSESSMENT	PERFORMANCE CRITERIA
<p>Understanding Alarm Priorities</p>	<p>States: The monitor has two different types of alarms:</p> <ul style="list-style-type: none"> • Physiological alarms are triggered by patient measurement exceeding the parameter limits, or by abnormal patient conditions • Technical alarms are triggered due to changes in electrical, mechanical or sensor function <p>States: The alarms are classified into the following priority levels:</p> <ul style="list-style-type: none"> • High priority (red) alarms: indicates a life threatening situation or a severe device malfunction and require an immediate response • Medium priority (yellow) alarms: indicates abnormal vital signs or a device malfunction and require a prompt response • Low priority (blue) alarms: indicate a discomfort condition, a device malfunction, or an improper operation and require you to be aware of this condition • Messages (blue): provides additional information on the patient or the equipment • Technical (blue) alarms: indicating changes in system functionality
<p>Accessing the Alarm Setup Menu</p> 	<p>States: Selecting the Alarm Setup quick key accesses the Alarm Setup menu which enabling the following actions:</p> <ul style="list-style-type: none"> • Enable and Disable alarms • Adjust alarm parameter levels • Adjust alarm priority
<p>Adjusting Alarm Limits</p> 	<p>Demonstrates adjusting a parameter alarm limit on the monitor by:</p> <ul style="list-style-type: none"> • Selecting the Alarm Setup quick key to access the Alarm Setup menu <p>OR</p> <ul style="list-style-type: none"> • Selecting the parameter numeric on the screen to access the Alarm Setup menu • Scrolls to access the alarm parameter to be adjusted → selects the parameter alarm limit value → adjusts the alarm limit value
<p>Adjusting an Alarm level</p> 	<p>Demonstrates adjusting an alarm priority level:</p> <ul style="list-style-type: none"> • Enters the Alarm Setup menu → selects the desired alarm priority
<p>Utilising Auto Limits</p> 	<p>States: Selecting Auto limits will automatically adjust all alarm limits according the patient's vital signs. The monitor calculates safe auto limits based on the latest measured values</p> <ul style="list-style-type: none"> • Select the Alarm Setup quick key → select the Limits tab → select Auto Limits • Select OK from the popup dialog box

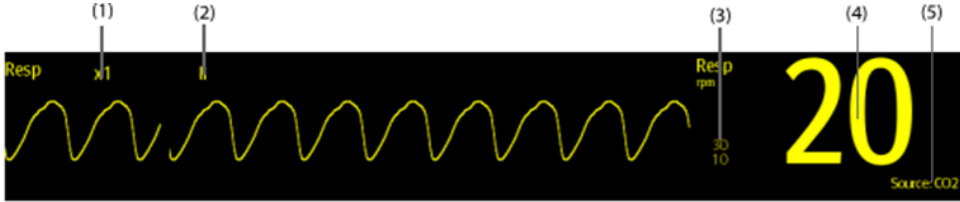



ALARM MANAGEMENT

ASSESSMENT	PERFORMANCE CRITERIA
<p>Managing Arrhythmia Thresholds</p> 	<p>Demonstrates manually adjusting the Arrhythmia alarm limits by:</p> <ul style="list-style-type: none"> • Selecting the Alarm Setup quick key • Selecting the Arrhythmia tab → Threshold from the vertical menu • Adjusting alarm limit as required
<p>Understanding Alarm Status Symbols</p>	<p>Recognises the following Alarm Status Symbols:</p> <ul style="list-style-type: none">  Alarm Pause: all the alarms are paused  Alarm Off: individual measurement alarms are disabled  Audio Pause: audible alarm tones are paused  Audio Off: audible alarm tones are disabled  Alarm Reset: alarms have been acknowledged and system has been reset
<p>Resetting Physiological and Technical Alarms</p> 	<p>States: Pressing the Alarm Reset quick key will acknowledge the ongoing alarms and reset the alarm system:</p> <ul style="list-style-type: none"> • The alarm sound is silenced • A ✓ appears before the alarm message, indicating that the alarm has been acknowledged • The colour of the parameter numeric background corresponds to the alarm priority during the physiological alarm condition, but the parameter does not flash
<p>Alarm Pause & Audio Pause</p>  	<p>States: Selecting Alarm Pause temporarily disables alarm indicators:</p> <ul style="list-style-type: none"> • Disables visual and audible indication of all physiological alarms. • For technical alarms, alarm sounds are paused, but the alarm lamp and messages remain presented • The remaining alarm pause time is displayed in the physiological alarm information area. The alarm pause symbol is displayed • When the alarm pause time expires, the alarm paused status is automatically deactivated • Alarm pause status can be cancelled by pressing the Alarm Pause quick key <p>Selecting Audio Pause temporarily disables alarm tones:</p> <ul style="list-style-type: none"> • Disables audible indication of all physiological and technical alarms • The remaining audio pause time is displayed in the physiological alarm information area. The audio pause symbol is displayed • When the audio pause time expires, the audio paused status is automatically deactivated • Audio pause status can be cancelled by pressing the Audio Pause quick key

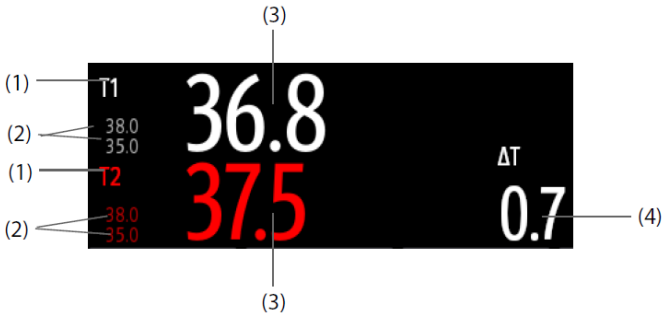
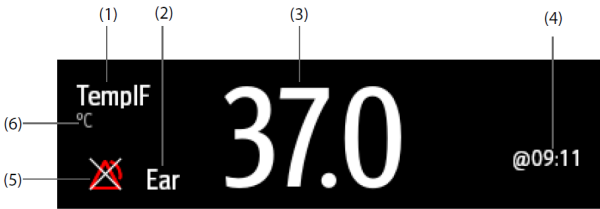
ASSESSMENT	PERFORMANCE CRITERIA
<p>Understanding the ECG Display</p>	<p>Correctly identifies the ECG Waveform and Numeric area:</p>  <p>(1) ECG lead label of the waveform (5) Paced status icon (2) ECG Waveform gain (6) HR/PR alarm message (3) ECG Filter Mode (7) Pacing spike identifier (4) Notch filter status</p>  <p>(8) Parameter Label (11) HR Value (9) HR Unit (12) ECG Signal Quality Index (10) HR Alarm limits (13) Pleth Signal Quality Index</p>
<p>Understanding CrozFusion™</p> 	<p>States: The CrozFusion™ function analyses the ECG signal and the Pleth wave signal together to achieve more accurate arrhythmia analysis and HR/PR measurements. The ECG SQI, PlethSQI and signal fusion status are displayed when the Crozfusion™ function is enabled.</p> <p> The quality of both ECG and Pleth signal is good and are independently analysed</p> <p> The quality of the Pleth signal is poor. The PR value may be erroneous. The ECG signal is being used to correct the PR value</p> <p> The quality of ECG signal is poor. The HR value and arrhythmia analysis may be erroneous. The Pleth signal is being used to correct the HR value</p>
<p>Changing an ECG Lead View</p>	<p>Demonstrates selecting displayed ECG Waveforms by:</p> <ul style="list-style-type: none"> • Selecting the ECG waveform area to enter ECG Setup menu • Selecting ECG ECG to set the leads of each ECG waveform
<p>Changing ECG Waveform Size</p>	<p>Demonstrates increasing the ECG Waveform size by:</p> <ul style="list-style-type: none"> • Selecting the ECG waveform to enter ECG Setup menu • Selecting ECG Gain size ECG Gain x1 from the labels displayed


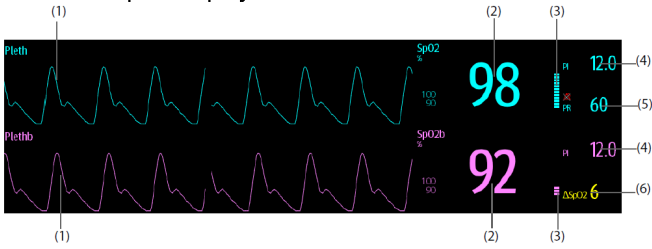



ASSESSMENT	PERFORMANCE CRITERIA
<p>Adjusting QRS Volume</p> 	<p>Demonstrates how to adjust QRS Volume by:</p> <ul style="list-style-type: none"> • Selecting the ECG waveform to enter ECG Setup menu • Adjusting QRS Volume from the volume menu
<p>Setting ECG Filter</p> 	<p>Describes the different Filter options:</p> <ul style="list-style-type: none"> • Diagnostic: use when diagnostic quality is required. The unfiltered ECG waveform is displayed so that changes such as R-wave notching or discrete elevation or depression of the ST segment are visible • Monitor: use under normal measurement conditions • Surgery: use when the signal is distorted by high frequency or low frequency interference. High frequency interference usually results in large amplitude spikes making the ECG signal look irregular • ST: use during ST monitoring <p>Demonstrates how to set appropriate ECG Waveform Filtering mode by:</p> <ul style="list-style-type: none"> • Selecting the ECG waveform to enter ECG Setup menu • Selecting filter Filter Diagnostic option from the labels displayed
<p>Adjusting Pacing Status</p> 	<p>Explains:</p> <ul style="list-style-type: none"> •  Paced status set to Yes. Paced Pulse markers "I" are shown on each ECG waveform when the patient has a paced signal •  Paced status set to No <p>Demonstrates how to change the Paced Status:</p> <ul style="list-style-type: none"> • Selects the ECG numeric area to enter the ECG menu → selects the Pacer tab → sets Paced to Yes or No
<p>Choosing an ECG Mode Screen</p> 	<p>Demonstrates how to change ECG Modes between 3,5,6 and 12-Lead monitoring:</p> <ul style="list-style-type: none"> • Selects the ECG waveform or numeric area to enter the ECG menu • Selects from the options Half Screen, Full Screen or 12-Lead to enter the desired mode
<p>Initiating 12-Lead ECG Analysis</p> 	<p>Demonstrates entering the 12-Lead ECG screen:</p> <ul style="list-style-type: none"> • Selects the ECG numeric area to enter the ECG menu → selects 12-Lead from the bottom of the ECG menu <p>Demonstrates how to perform a 12-Lead analysis by:</p> <ul style="list-style-type: none"> • Waiting for two cycles of wave trace to be received to ensure adequate trace • Selects analyze from bottom left of the screen to activate analysis • On completed 12-lead analysis selects save to store the analysed report • At completion of the 12-lead report select Print or Record to output to a printer (via CMS) or built in recorder • Selects Exit to leave the 12-lead screen

RESPIRATION

ASSESSMENT	PERFORMANCE CRITERIA
<p>Understanding the Respiration Display</p>	<p>Correctly identifies the Respiratory display area:</p>  <ul style="list-style-type: none"> (1) Respiratory waveform gain (2) Respiratory lead Label (3) Alarm Limits (4) Respiratory rate value (5) Respiratory rate source
<p>Understanding the Respiration Measurement Source</p>  	<p>States: When configured to Auto, the system automatically selects the RR source according to the priority The priority of RR source is:</p> <ul style="list-style-type: none"> • CO₂ • RM • ECG <p>Demonstrates setting the respiration lead by:</p> <ul style="list-style-type: none"> • Selecting the Resp waveform area to enter the Resp Setup menu → selecting Resp lead from the labels displayed in the dropdown menu
<p>Choosing the Respiration Lead</p>	<p>Demonstrates setting the respiration lead by:</p> <ul style="list-style-type: none"> • Selecting the Resp waveform area to enter the Resp Setup menu → selecting Resp lead from the labels displayed in the dropdown menu
<p>Setting the Respiration Waveform Size</p>	<p>Demonstrates setting the Respiration waveform size:</p> <ul style="list-style-type: none"> • Selects the Resp waveform area to enter the Resp Setup menu → selects the Gain value from the labels displayed in the dropdown menu
<p>Selecting the Apnoea Delay Time</p> 	<p>Demonstrates setting the Apnoea delay time by:</p> <ul style="list-style-type: none"> • Selecting the Resp Numeric area to enter the Resp Alarm menu → selecting Apnoea Delay time from the labels displayed in the dropdown menu

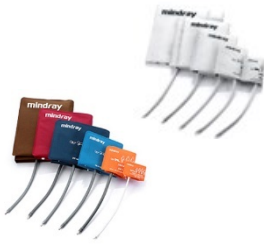
TEMPERATURE

ASSESSMENT	PERFORMANCE CRITERIA
<p>Understanding the Temperature Display</p>	<p>Correctly identifies the Temperature display area:</p>  <p>(1) Temperature site (2) Alarm limits (3) Temperature value (4) Temperature difference (ΔT): Difference between two temperature sites. It displays only when ΔT is switched on</p>
<p>Understanding the Genius™ 2 Tethered Temperature Display</p>	<p>Correctly identifies the Genius™ 2 Tethered Temperature display area:</p>  <p>(1) Temperature label (2) Temperature site (3) Temperature value (4) Temperature time (5) Temperature alarm limits (6) Temperature unit</p>
<p>Selecting Temperature Label</p>	<p>Demonstrates selecting the Temperature label:</p> <ul style="list-style-type: none"> • Selects the Temp Numeric area to enter the Temp Alarm menu → selects the Setup tab → sets the Temp Label

ASSESSMENT	PERFORMANCE CRITERIA
<p>Correct Selection and Application of the SpO₂ Sensor</p> 	<p>States:</p> <ul style="list-style-type: none"> Different sensors are available for finger and earlobe placement, and as reusable / single patient use Sensor selection should depend on the weight range of the patient (see sensor packaging) The sensor should be fitted with the finger diagram uppermost Incorrect sensor placement can result in less than optimum measurements
<p>Understanding the SpO₂ Display</p>	<p>Correctly identifies the SpO₂ display area:</p>  <p>(1) Pleth waveform (2) Oxygen saturation of arterial blood (3) Perfusion Indicator (4) Perfusion Index (5) Pulse rate (6) SpO₂ difference</p>
<p>Understanding Perfusion Index (PI)</p> 	<p>States:</p> <ul style="list-style-type: none"> Perfusion index (PI) is an indicator of pulsatile strength and signal quality of SpO₂ measurement available for Mindray SpO₂ A value greater than 1.0 is optimal A value between 0.3 and 1.0 is acceptable A value below 0.3 indicates low perfusion, and repositioning of the sensor is advisable For persistent low PI value, an alternative measurement method is indicated
<p>Explanation of the SpO₂ Desat Alarm</p>	<p>States:</p> <ul style="list-style-type: none"> A High Level alarm notifying the user of a potential life-threatening decreases in Pulse Oxygen Saturation
<p>Monitoring SpO₂ and NIBP Simultaneously</p>  	<p>Understands:</p> <p>When monitoring SpO₂ and NIBP on the same limb simultaneously, NIBP Simul can be switched on to lock the SpO₂ alarm status until the NIBP measurement ends. This prevents inaccurate SpO₂ readings arising from the low perfusion caused by NIBP cuff inflation.</p> <p>A prompt message is displayed when SpO₂ and NIBP measurement is detected on the same limb.</p> <p>Demonstrates how to enable NIBP Simul by:</p> <ul style="list-style-type: none"> Selecting the SpO₂ numeric area to enter the SpO₂ menu → selects the Alarm tab → set NIBP Simul

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Correct Selection and Application of NIBP Cuff

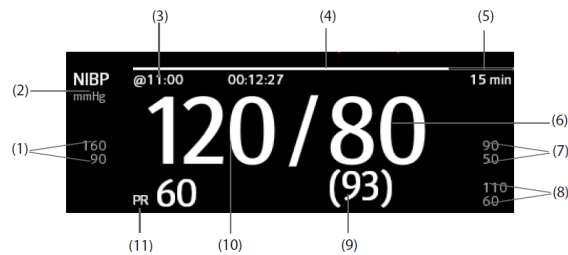


States:

- Verify correct selection of Patient Category
- Select an appropriately sized cuff by referring to the limb circumference marked on the cuff
- Apply the cuff to the patient’s upper arm or leg, ensuring the **Ⓛ** marking on the cuff matches the artery location
- The cuff should fit snugly, but with enough room for two fingers to be placed between the cuff and the patient’s limb (on adults) and loosely on neonates with little or no air present within the cuff
- Do not use NIBP cuff on limb with an Intravenous Infusion or arterial catheter in place
- The middle of the NIBP cuff should be in line with the right atrium of the heart
- An incorrect cuff size may give inaccurate readings
- A cuff that is too narrow for the limb may result in high readings
- A cuff that is too large may result in low readings

Understanding the NIBP Display

Correctly identifies the NIBP display area:



- | | |
|------------------------------------|------------------------------------|
| (1) Systolic pressure alarm limits | (6) Diastolic pressure |
| (2) NIBP unit | (7) Diastolic pressure alarm limit |
| (3) The last NIBP measurement time | (8) Mean pressure limit |
| (4) Time to next measurement | (9) Mean pressure / cuff pressure |
| (5) Measurement mode | (10) Systolic pressure |

- If NIBP measurement fails, "XX" is displayed
- If NIBP measurement is not taken "--" is displayed
- Lightly filled and outlined NIBP numerics indicate that the measurement is old and exceeds the set time. These values are not recommended for reference. Displayed colours are configuration dependent



NIBP Selectable Display Format and NIBP PR Display

Demonstrates selecting the NIBP display format:

- Selecting the NIBP numeric to enter the NIBP menu → selects the **Setup** tab → enter **NIBP Setup** Menu → selects the **Display Format** from the dropdown menu
- Slides **Display PR** to on or off



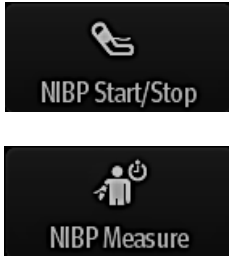
Systolic/ Diastolic (Mean)

(Mean) Systolic/ Diastolic

Mean

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

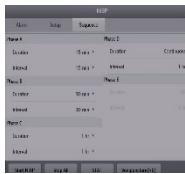
Performing an NIBP Measurement



Demonstrates starting and stopping an NIBP measurement by selecting an option below:

Task	By Quick Key	From NIBP menu
Start a manual measurement	NIBP Start/Stop quick key	Start NIBP button
Start auto NIBP series	NIBP Start/Stop quick key	Setup tab → set Interval → Start NIBP button
	NIBP Measure quick key	
Start sequence NIBP measurement	NIBP Measure quick key → Sequence	Sequence tab → set NIBP sequence → Start NIBP button
Start STAT measurement	NIBP STAT quick key	STAT button
	NIBP Measure quick key → STAT	
Stop the current NIBP measurements	NIBP Start/Stop quick key	Stop NIBP button
End auto NIBP series	Stop All quick key	Stop All button
Stop STAT measurement and end series	NIBP Start/Stop quick key	Stop NIBP or Stop All button
	NIBP STAT quick key	

Setting a Custom NIBP Interval Sequence



Demonstrates setting a custom NIBP interval sequence:

- Selects the NIBP numeric area to display the NIBP menu
- Selects **Sequence**
- Sets duration and interval for each interval phase
- Selects **Sequence** as NIBP interval via the **NIBP measure** quick key or NIBP menu

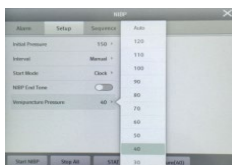
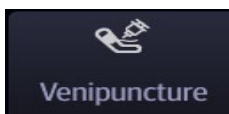
Setting the Cuff Inflation Pressure



Demonstrates how to set the initial cuff inflation pressure by:

- Selecting the NIBP numeric to enter the NIBP menu
- Selecting the **Setup** tab to enter NIBP Setup Menu
- Selects the **Initial Pressure** value from the dropdown menu

Assisting Venous Puncture



States:

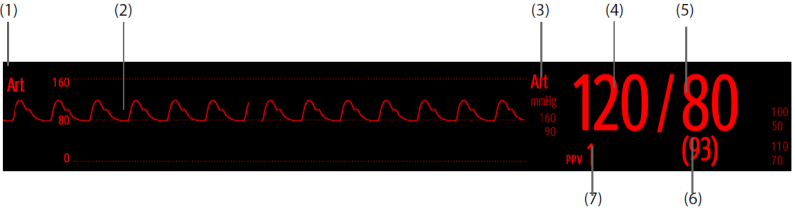
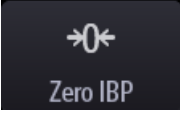
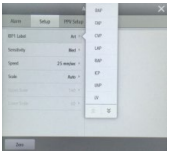
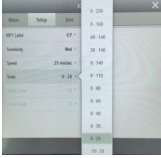

The NIBP cuff can be used to cause sub-diastolic pressure to occlude the venous blood vessel and therefore assist venous puncture.

Demonstrates the assist venipuncture function:

- Selects the **Venipuncture** quick key
- OR
- Selects the NIBP numeric area to display the NIBP menu
 - Selects the **Setup** tab
 - Selects the appropriate **Venipuncture Pressure** from the dropdown menu
 - Selects **Venipuncture tab** at the bottom of the menu to commence NIBP cuff inflation

States:

- Selecting the **NIBP Start / Stop** quick key to deflate the cuff
- OR
- The cuff automatically deflates after 170 seconds for adult and pediatric patients, 85 seconds for neonatal patients
 - During venous puncture, the cuff pressure and remaining time is displayed in the NIBP numeric area

ASSESSMENT	PERFORMANCE CRITERIA																																
<p>Understanding the IBP Display</p>	<p>Correctly identifies the IBP display area:</p>  <p>(1) Pressure label (2) Waveform (3) Pressure unit (4) Systolic pressure (5) Diastolic pressure (6) Mean pressure (7) PPV measurement</p>																																
<p>Zeroing the Pressure Transducer</p> 	<p>Demonstrates Zeroing the IBP Transducer:</p> <ul style="list-style-type: none"> Connects the IBP Transducer, adaptor cable and module Turn off the three way valve (the one near the transducer) to the patient, in order to vent the transducer to atmospheric pressure by removing the cap Zero the transducer by one of the following methods: <ol style="list-style-type: none"> Press the Zero hard key on the module Select an IBP Numeric Area (ie. Arterial) → select zero button Select the Zero IBP quick key → select the invasive pressure to be zeroed Turn the three way valve off to the patient and re apply the cap 																																
<p>Changing IBP labels</p> 	<p>Demonstrates changing an IBP label:</p> <ul style="list-style-type: none"> Selects the IBP waveform area Selects desired label for IBP1 Label or IBP2 Label from the drop-down menus <table border="1" data-bbox="742 1227 1241 1400"> <thead> <tr> <th>Label</th> <th>Description</th> <th>Label</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>PA</td> <td>Pulmonary artery pressure</td> <td>CVP</td> <td>Central venous pressure</td> </tr> <tr> <td>Ao</td> <td>Aortic pressure</td> <td>LAP</td> <td>Left atrial pressure</td> </tr> <tr> <td>UAP</td> <td>Umbilical arterial pressure</td> <td>RAP</td> <td>Right atrial pressure</td> </tr> <tr> <td>BAP</td> <td>Brachial arterial pressure</td> <td>ICP</td> <td>Intracranial pressure</td> </tr> <tr> <td>FAP</td> <td>Femoral arterial pressure</td> <td>UVP</td> <td>Umbilical venous pressure</td> </tr> <tr> <td>Art</td> <td>Arterial blood pressure</td> <td>LV</td> <td>Left ventricular pressure</td> </tr> <tr> <td>CPP</td> <td>Cerebral perfusion pressure</td> <td>P1 to P4</td> <td>Non-specific pressure label</td> </tr> </tbody> </table> <p>The same label cannot be selected for different pressures</p>	Label	Description	Label	Description	PA	Pulmonary artery pressure	CVP	Central venous pressure	Ao	Aortic pressure	LAP	Left atrial pressure	UAP	Umbilical arterial pressure	RAP	Right atrial pressure	BAP	Brachial arterial pressure	ICP	Intracranial pressure	FAP	Femoral arterial pressure	UVP	Umbilical venous pressure	Art	Arterial blood pressure	LV	Left ventricular pressure	CPP	Cerebral perfusion pressure	P1 to P4	Non-specific pressure label
Label	Description	Label	Description																														
PA	Pulmonary artery pressure	CVP	Central venous pressure																														
Ao	Aortic pressure	LAP	Left atrial pressure																														
UAP	Umbilical arterial pressure	RAP	Right atrial pressure																														
BAP	Brachial arterial pressure	ICP	Intracranial pressure																														
FAP	Femoral arterial pressure	UVP	Umbilical venous pressure																														
Art	Arterial blood pressure	LV	Left ventricular pressure																														
CPP	Cerebral perfusion pressure	P1 to P4	Non-specific pressure label																														
<p>Adjusting IBP Waveform Scale</p> 	<p>Demonstrates how to manage the IBP waveform scale:</p> <ul style="list-style-type: none"> Selects the IBP waveform area Selects Scale from the drop down menu 																																
<p>IBP Selectable Display Format</p>	<p>Demonstrates selecting the NIBP display format:</p> <ul style="list-style-type: none"> Selecting the NIBP numeric to enter the NIBP menu → selects the Setup tab → enter NIBP Setup Menu → selects the Display Format from the dropdown menu  <p>Systolic/ Diastolic (Mean) (Mean) Systolic/ Diastolic Mean</p>																																

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Recognises the different CO₂ Modules and Accessories



Understands the differences between Sidestream, Microstream and Mainstream CO₂

Sidestream CO₂

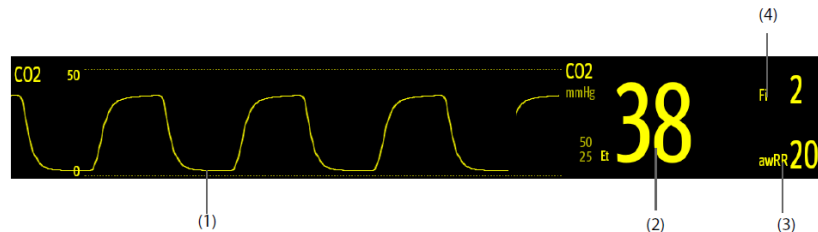
Microstream CO₂

Mainstream CO₂

(1) CO₂ Menu hard key
 (2) CO₂ Measure / Standby hard key
 (3) CO₂ Watertrap seat
 (4) Gas outlet
 (5) Sample line connector
 (6) CO₂ sensor connector
 (7) N1 integrated CO₂ Adaptor connector

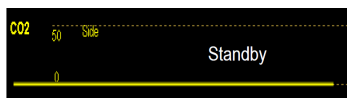
Understanding the CO₂ Parameter Display

Correctly identifies the CO₂ parameter display area



- (1) CO₂ waveform (2) End tidal CO₂ value (EtCO₂)
 (3) Airway respiration rate (awRR) (4) Fraction of inspired CO₂ (FiCO₂)

Entering and Exiting Standby Mode



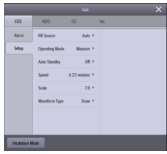
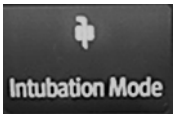
States:

The CO₂ module can be set to one of the following modes according to the module status:

- Select **Measure** mode when you use the CO₂ module for monitoring (default setting)
- Select **Standby** mode when the CO₂ module is not in use

Demonstrates setting the mode by:

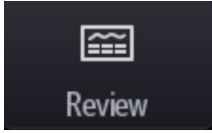
- Selecting the CO₂ waveform area to enter the CO₂ Setup menu
- Selecting **Operating Mode** and setting appropriate mode in the menu

ASSESSMENT	PERFORMANCE CRITERIA
<p>Setting the CO₂ Waveform</p> 	<p>Demonstrates how to change Waveform type, Speed and CO₂ Scale within the CO₂ setup menu:</p> <ul style="list-style-type: none"> • Selects the CO₂ numeric area or waveform to enter CO₂ menu → selects the Setup tab • Selects the desired option of Waveform type, Speed and CO₂ scale in the dropdown menu
<p>Setting the Auto Standby</p>	<p>States: The module enters standby mode automatically after the configured period of time if no breath is detected since the last detected breath.</p> <p>Demonstrates how to set the Auto Standby feature within the CO₂ setup menu:</p> <ul style="list-style-type: none"> • Selects the CO₂ numeric area or waveform to enter CO₂ menu → selects the Setup tab • Selects the desired option of Auto Standby interval in the dropdown menu
<p>Setting Humidity Compensation</p>	<p>States: Sidestream and Microstream CO₂ modules are configured to compensate CO₂ readings for either Body temperature and Pressure, Saturated Gas (BTPS), to account for humidity in the patient's breath, or Ambient Temperature and Pressure, Dry Gas (ATPD).</p> <p>Demonstrates setting the humidity compensation:</p> <ul style="list-style-type: none"> • Selects the CO₂ numeric area or waveform to enter CO₂ menu → selects the Setup tab • Sets the BTPS Compensation → switch ON for BTPS → switch OFF for ATPD
<p>Using Intubation Mode</p> 	<p>States: Intubation mode is available for Respiratory, CO₂, AG and RM monitoring and disables Respiratory, CO₂, RM and AG related physiological alarms for a pre configured time interval.</p> <p>Demonstrates how to enter intubation mode by:</p> <ul style="list-style-type: none"> • Selecting the Intubation Mode quick key <p>OR</p> <ul style="list-style-type: none"> • Viewing the bottom of the menu, and selecting Intubation mode <p>OR</p> <ul style="list-style-type: none"> • Selecting the Main Menu quick key • Finding the Alarm column and selecting Intubation mode

REVIEW

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Accessing the Review Page



States:

The review page contains tabs to display trend data in tabular, graphic, or other Forms.





Demonstrates accessing the Review Page:

- Selecting the **Review** quick key
- OR
- Selecting the **Main Menu** quick key → from the **Review** column select the desired option from the tabs at the top of the screen from the following list. **Tabular trends, Graphic Trends, Events, Full Disclosure & 12-Lead**

Understanding the Review Page

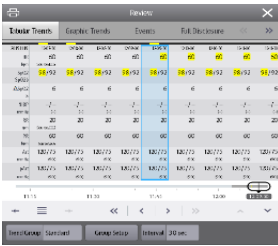
Correctly identifies the layout of the Review page:



- (1) Event type indicator: different colour blocks match different event types:
 - **RED:** High priority alarm event
 - **YELLOW:** Medium priority alarm event
 - **CYAN:** Low priority alarm event
 - **GREEN:** Manual event
 - **WHITE:** Operation related event
- (2) Current window timeline
- (3) Data display area: displays trend data
- (4) Slider: indicates position of the current window in the full captured timeline
- (5) Event area: displays the event of the cursor time
- (6) Cursor: displays selected information
- (7) Numeric area
- (8) Timeline:
 -  indicates the time length of reviewable trend data
 can be moved within the time length to browse data
 -  indicates the time length of no trend data
 cannot be moved within the time length
 - Different colour blocks indicate events of different priority
- (9) Button area

ASSESSMENT	PERFORMANCE CRITERIA
------------	----------------------

Tabular Trends Review



States:

The tabular trends review page displays numeric trend data in a tabular form.

Demonstrates:

Entering the Tabular Trends Review page by:

- Selecting the **Review** quick key → **Tabular Trends** tab

OR

- Selecting the **Main Menu** quick key → from the **Review** column select **Tabular Trends**

Changing the Trend Group:

- Selecting the **Review** quick key → selecting the desired tab → set **Trend Group**

Changing the Resolution of Trend Data:

- Enters the tabular trends review page → selects chosen **Interval**

Graphic Trends Review



States:

The graphic trends review page displays trend data in a linear graphic form.

Demonstrates:

Entering the Graphics Trends Review page by:

- Selecting the **Review** quick key → **Graphic Trends** tab

OR

- Selecting the **Main Menu** quick key → from the **Review** column select **Graphic Trends**

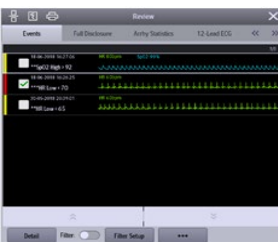
Changing the Trend Group:

- Selecting the **Review** quick key → selecting the desired tab → set **Trend Group**

Changing the Resolution of Trend Data:

- Enters the **Graphic Trends** review page → selects **Zoom** → selects **Zoom period**

Events Review



States:

Alarm events are stored in real time, including technical alarm events, physiological alarm events, manual events, and operational events.

When an event occurs, all the measurement numerics and three event-related waveforms 16 seconds before and after the event are stored.

The most recent event is displayed at the top.

The number of asterisk symbols before an event indicate alarm priorities.


Coloured blocks displayed on the left of each event indicate event priorities.

Demonstrates entering the Events Review page by:







- Selecting the **Review** quick key → **Events** tab

OR

- Selecting the **Main Menu** quick key → from the **Review** column select **Events**

ASSESSMENT	PERFORMANCE CRITERIA
<p>Full Disclosure Review</p> 	<p>States: Up to 48-hours compressed waveforms, full waveforms and numeric values on the full disclosure can be viewed on the Full Disclosure review page.</p> <p>Demonstrates entering the Full Disclosure Review page by:</p> <ul style="list-style-type: none"> • Selecting the Review quick key → Full Disclosure tab <p>OR</p> <ul style="list-style-type: none"> • Selecting the Main Menu quick key → from Review column select Full Disclosure
<p>Viewing Details of Compressed Waveforms</p> 	<p>Demonstrates viewing the Full Waveforms and Numeric values by:</p> <ul style="list-style-type: none"> • Entering the Full Disclosure review page • Highlighting the specific area of waveform to be viewed • Select Details • To exit detailed view select Overview
<p>12 Lead ECG Review</p> 	<p>States: The most recent 20 events of completed 12-lead analysis can be viewed.</p> <p>Demonstrates entering the 12 Lead Review page by:</p> <ul style="list-style-type: none"> • Selecting the Review quick key → 12 Lead tab <p>OR</p> <ul style="list-style-type: none"> • Selecting the Main Menu quick key → from the Review column select 12 Lead ECG → upon completion of 12-lead ECG analysis, select Review from the 12-Lead Interpretation screen <p>Demonstrates how to view the saved 12 Lead ECG list:</p> <ul style="list-style-type: none"> • Enters the 12 lead ECG Page → select  to view date and timestamped list of the saved ECG data
<p>Displaying Two Review Pages Simultaneously (N22/N19 only)</p>	<p>States: For the N22 and N19, two review pages can be displayed simultaneously.</p> <p>Displays two review pages simultaneously by:</p> <ul style="list-style-type: none"> • Entering the desired review page by selecting the Review quick key → selecting the desired tab <p>OR</p> <ul style="list-style-type: none"> • Selecting the Main Menu quick key → from the Review column selecting the desired menu item • Selecting  for Landscape display or  for Portrait display

PRINTING

ASSESSMENT	PERFORMANCE CRITERIA
<p>Printing Tabular and Graphic Trend Reports</p> 	<p>Prints Tabular and Graphic Trend Reports by:</p> <ul style="list-style-type: none"> • Entering the tabular trends or graphic trends review page • Selecting  at the upper left corner of the review page to enter the Print Setup menu • Selecting  in the Tabular Trends Report menu or Graphic Trends Report menu to print the report
<p>Printing Event Reports</p>	<p>Demonstrates Printing Event Reports by:</p> <ul style="list-style-type: none"> • Entering the Events review page • Selects  to enter the Print Setup menu • Selects the desired option <p>Print Event List: print the entire event list Print List of Selected Events: Print Detail of Selected Events: Print Displayed Event Detail: print the waveforms and parameters of the currently displayed event</p>
<p>Printing Full Disclosure Waveform Reports</p>	<p>Explains how to Print Compressed Waveform Reports by:</p> <ul style="list-style-type: none"> • Entering the Full Disclosure review page • Selecting  and set the time range for printing
<p>Printing the 12-Lead ECG Report</p>	<p>Demonstrates Printing the 12-Lead ECG Report by:</p> <ul style="list-style-type: none"> • Entering the 12-Lead review page • Selecting 

T: 01480 416840

E: ukcustomerservice@mindray.com

Mindray UK Limited, Hinchingsbrooke Business Park, Huntingdon, Cambridgeshire, PE29 6FN

www.mindrayuk.com

mindray

MRUKC001 ©2020 Mindray. Errors and omissions excepted. Subject to change.
Mindray® is a registered trademark of Shenzhen Mindray Bio-Medical Electronics Co. Ltd.