WHAT IS A CNS MONITORING PROTOCOL?

This document describes the concept and use of Monitoring Protocols created for CNS Monitors running software application version A.12.174 or newer.

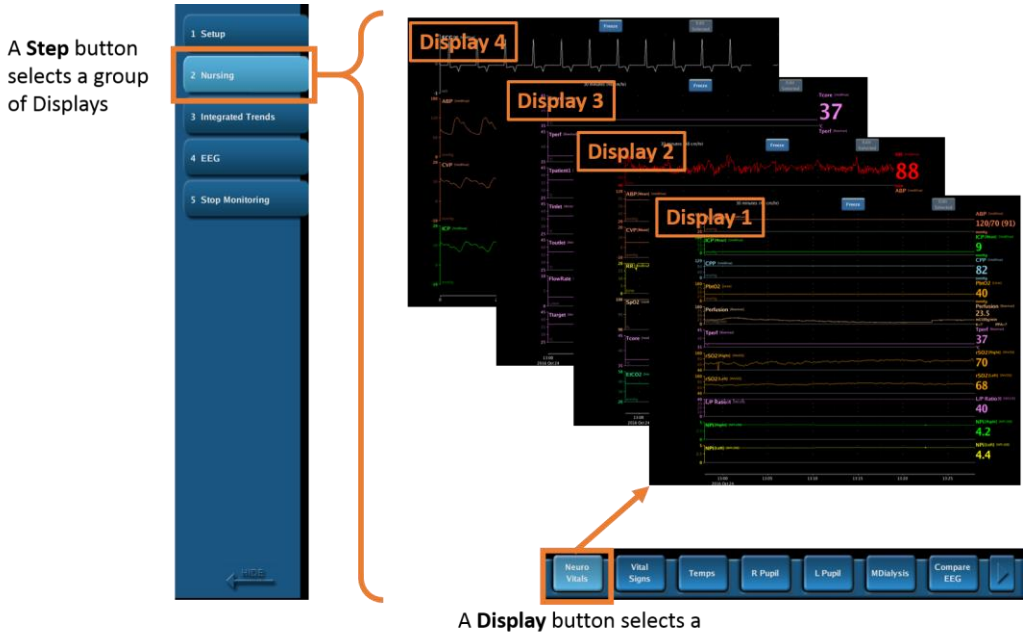
A ***Monitoring Protocol*** is a set of devices, measurements, Steps, and Displays used to monitor a specific type of patient. Based on the CNS Monitor's EEG features, a protocol typically includes a selected input configuration and EEG montage(s). Users have the option to build/select a protocol where "No EEG" is designated as the input configuration or to select "Start Later" during Set Up if EEG is not desired.

Note: While the montage used for EEG data display purposes can be modified any time during a monitoring session, the EEG input configuration is fixed once data collection has begun.

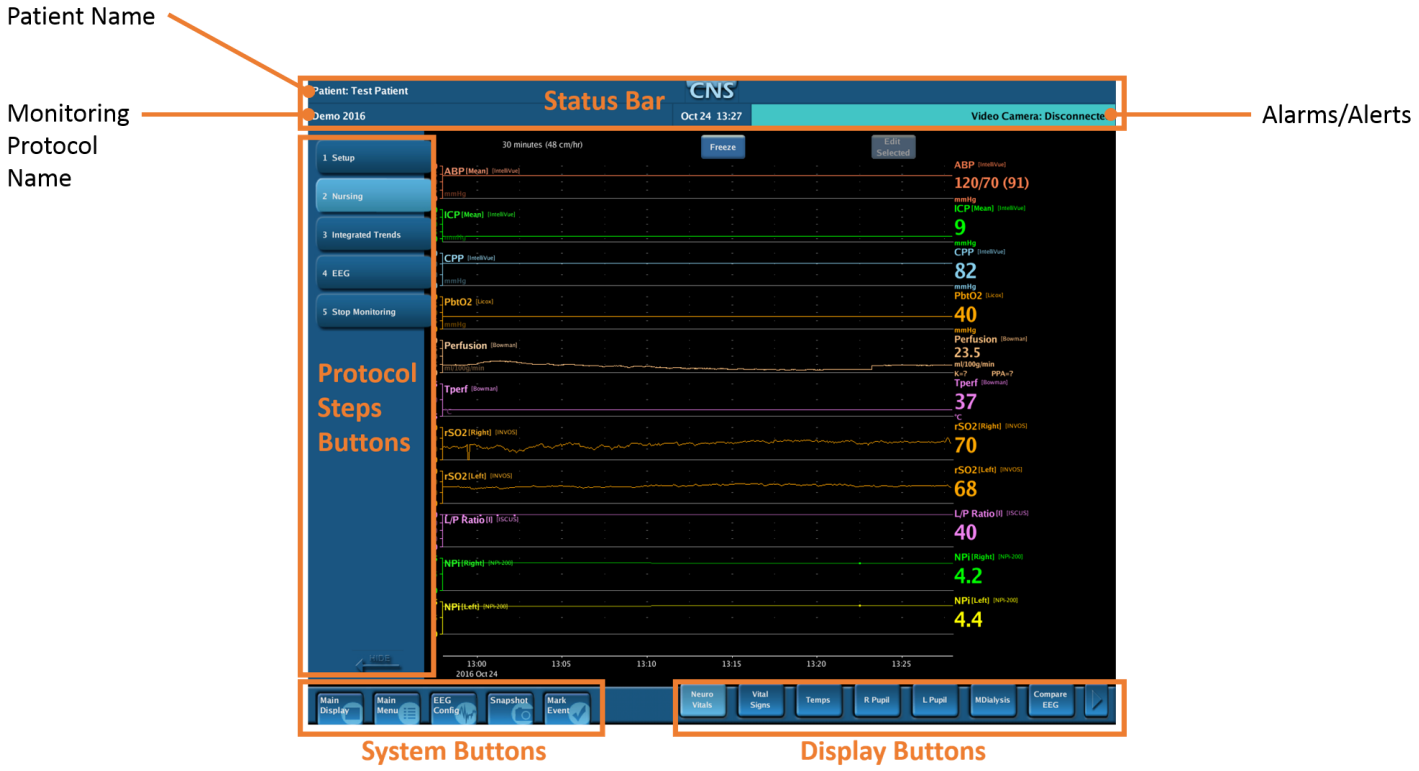
Note: Please refer to the technical bulletin "Editing Protocols on the CNS Monitor" for how to create and edit a monitoring protocol.

Within a Monitoring Protocol, information is presented to the user by means of ***Displays***. A Display may contain physiological data (waveforms, trends, numerics, etc.), informational content (instructions for setting up a device) or other content. Displays are organized into groups called ***Steps***.

The grouping of Displays is arbitrary, but typically it is used to group certain functions in a monitoring application for ease of use. The Display groups can represent "steps" in a care pathway or protocol (depending on how the monitor is configured), or they can help organize displays that are common to specific users, such as Nursing or EEG personnel.



During a monitoring session, the CNS Monitor will appear similar to the figure below. A Status Bar will provide patient related information, it will specify the Monitoring Protocol being used (e.g. “Demo 2016”), and any system alarms/alerts. Buttons on the left hand side will show the Protocol Steps and buttons on the bottom right will list the Displays included in the selected Protocol Step. Buttons on the lower left are System Buttons and are common across Monitoring Protocols.

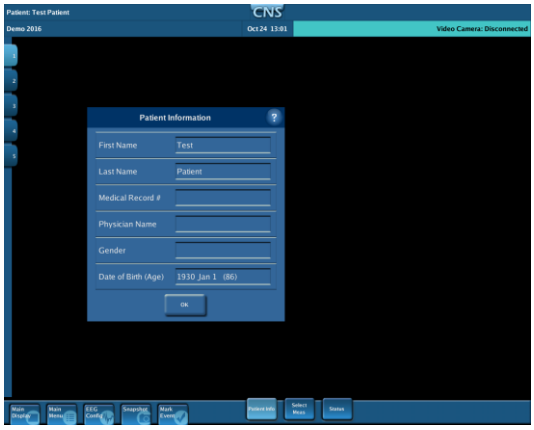


PRE-DEFINED STEPS

All Monitoring Protocols have two **Steps** - Setup and Stop Monitoring - that are pre-defined. These Steps help users set up the monitor, admit the patient for monitoring, discharge the patient after monitoring, and archive data at the end of the monitoring session. These steps are included in every protocol.

Setup

The Setup step lets the user enter patient information and provides a final selection/confirmation of measurements that will be recorded. It lets the user check the quality of the signals and provides access to relevant instructional content such as device setup information.



Stop Monitoring

The Stop Monitoring step provides instructions for pausing a monitoring session or discharging a patient (i.e. ending a monitoring session). Upon discharging the patient, the monitor instructs the user how to archive the collected data if desired. Data can be archived to a USB drive, to a network folder (if the CNS Monitor is connected to the hospital network), or to an external CD-R/DVD-R (if this option is available for the specific model of CNS Monitor).

SAMPLE PROTOCOL AND DISPLAYS

Here is a description of a sample protocol.

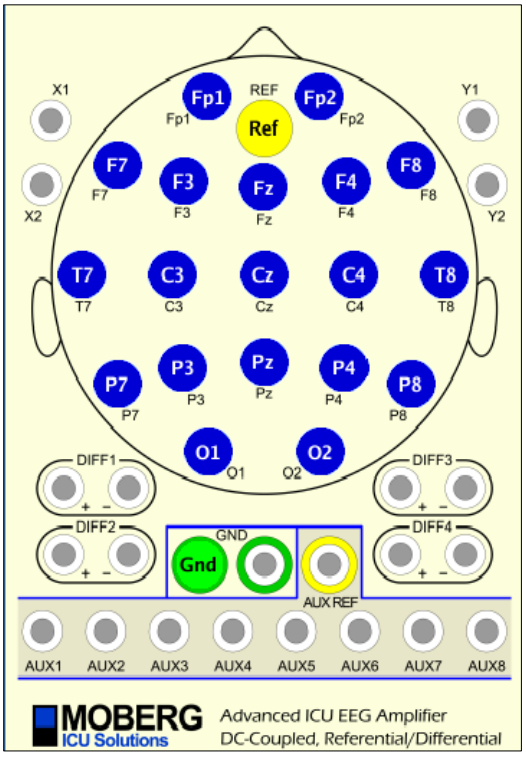
Selected devices:

- *Patient Monitor*: Philips IntelliVue
- *Neuro Monitors*: Advanced ICU EEG Amplifier, Bowman Perfusion Monitor, Covidien INVOS, ISCUSflex, Integra Camino, Integra Licox, NeurOptics Pupillometer
- *Other*: Arctic Sun

Selected Measurements:

- *Hemodynamic*: ABP, CVP, ECG, HR
- *Neuro*: CPP, ICP, Perfusion, Tperf, rSO2, Analytes, ICT, PbtO2, Pupil Size and NPi
- *Respiratory*: EtCO2, RR, SpO2
- *Temperature*: Tcore, FlowRate, Tinlet, Toutlet, Tpatient1, Tpatient2, Ttarget

Selected EEG Input Configuration:



Sample Steps:

- *Setup* (pre-defined)
  - *Patient Info*
  - *Select Measures*
  - *Status*

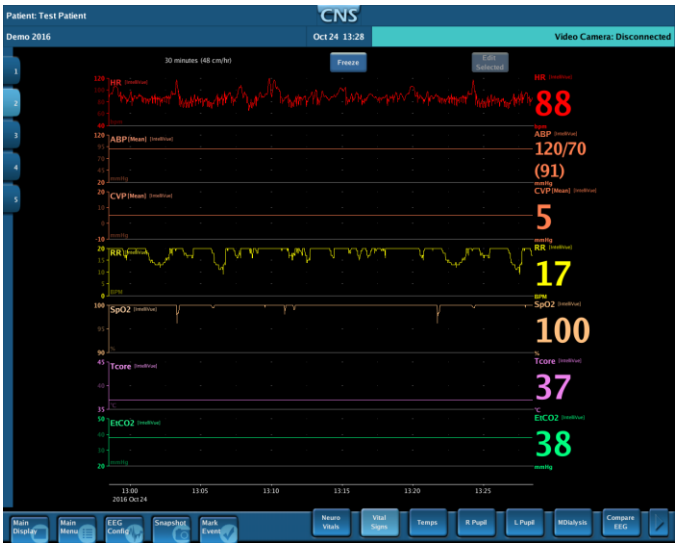
- *Nursing*:
  - *Neuro Vitals*: ABP[Mean], ICP[Mean], CPP, PbtO2, Perfusion, Tperf, rSO2, L/P Ratio, NPi Right, NPi Left
  - *Vital Signs*: HR, ABP[Mean], CVP, SpO2, Tcore, EtCO2
  - *Temps*: Tcore, Tperf, Tpatient1, Tinlet, Toutlet, FlowRate, Ttarget
  - *R Pupil*: Pupil Size[Right], Pupil Size Diff, NPi[Right], Pupil MIN[Right], Pupil CH[Right], Pupil CV[Right], Pupil LAT[Right], Pupil MCV[Right], Pupil DV[Right]
  - *L Pupil*: Pupil Size[Left], Pupil Size Diff, NPi[Left], Pupil MIN[Left], Pupil CH[Left], Pupil CV[Left], Pupil LAT[Left], Pupil MCV[Left], Pupil DV[Left]
  - *MDialysis*: Glucose, Lactate, Pyruvate, L/P Ratio, Glutamate, Glycerol
  - *Compare EEG*: EEG waveforms with comparison panel
  - *Waveforms*: ECG, ABP, CVP, ICP

- *Integrated Trends:*
  - *Neuro Trends 1*: ICP[Mean], PbtO2, Perfusion, L/P Ratio, Asymmetry, %Suppression, and DSAs for representative EEG channels
  - *Neuro Trends 2*: ICP[Mean], PbtO2, Perfusion, Asymmetry, %Suppression, and ADR for representative EEG channels

- *EEG:*
  - *EEG Bipolar*: EEG waveforms for a Longitudinal Bipolar Montage
  - *EEG Video*: EEG waveforms and video
  - *DSA L Lateral*: EEG waveforms and DSAs for longitudinal bipolar channels in left hemisphere
  - *DSA R Lateral*: EEG waveforms and DSAs for longitudinal bipolar channels in right hemisphere
  - *Power Bands*: power bands for representative EEG channels

- *Stop Monitoring* (pre-defined)

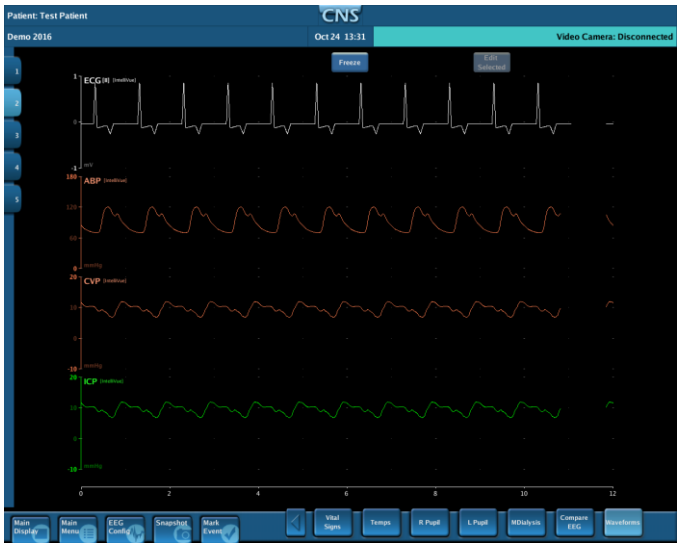
Below are sample displays of selected measurements.



Vital Signs: HR, ABP[Mean], CVP, RR, SpO2, Tcore, EtCO2

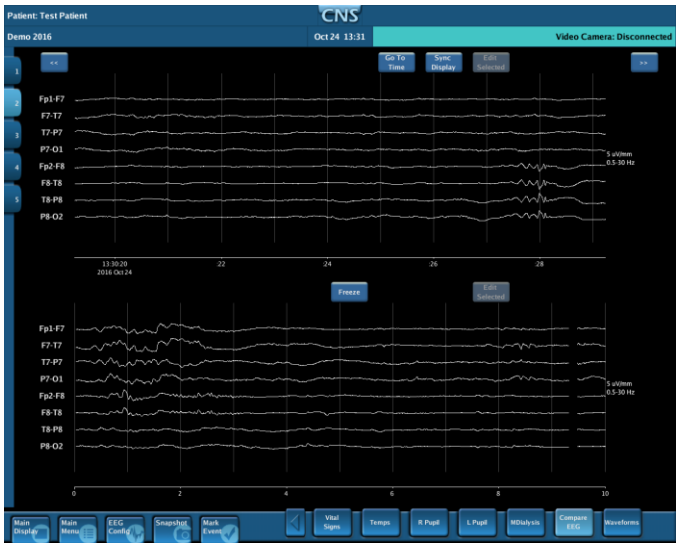
Neuro Vitals: ABP[Mean], ICP[Mean], CPP, PbtO2, Perfusion, Tperf, rSO2 (R & L), L/P Ratio, NPi Right, NPi Left

Integrated Trends: ICP[Mean], PbtO2, Perfusion, L/P Ratio, EEG Asymmetry, % Suppression, DSAs for selected EEG channels

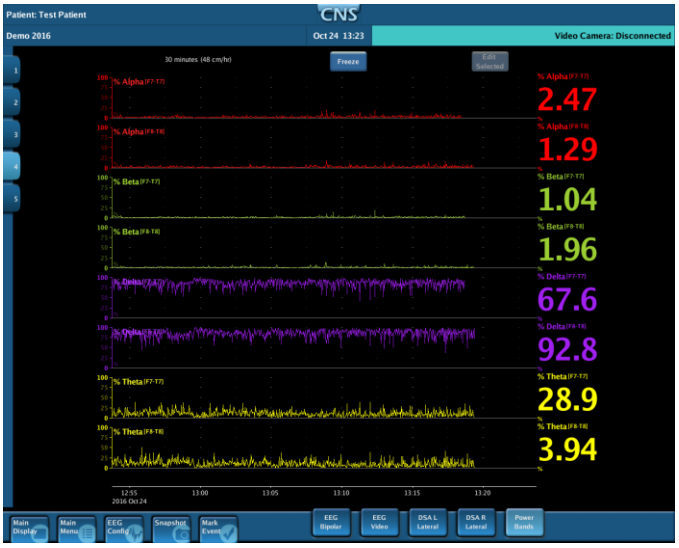


Waveforms: ECG, ABP waveform, CVP waveform, ICP waveform

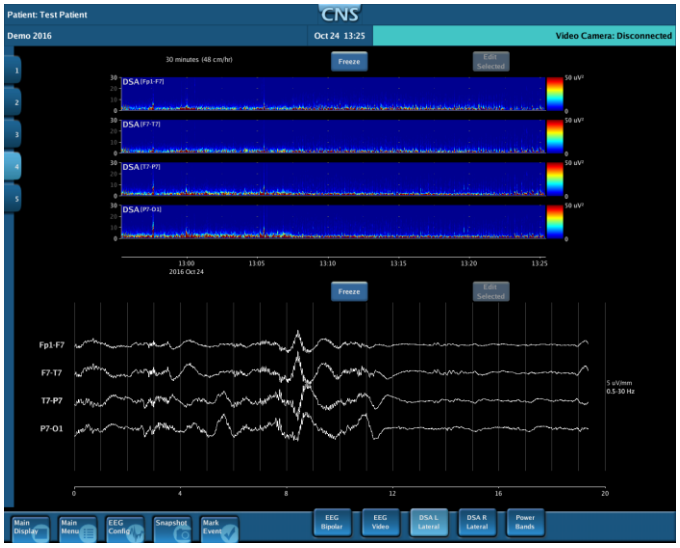
EEG Waveforms



EEG Waveforms with comparison panel



EEG Power Bands: % Alpha, % Beta, % Delta, % Theta for a set of EEG channels



DSAs: DSAs and waveforms for a set of EEG channels