

mNeuro Package

APPLICATION

The mNeuro Package is an optional package for Canon Medical Systems magnetic resonance imaging (MRI) systems. This package provides new pulse sequences for diffusion imaging, dynamic contrast imaging, and BOLD imaging as well as new imaging functions in order to expand the range of clinical applications.

APPLICABLE COMBINATIONS

This package is applicable to the following systems and second consoles.

System	Software version
Vantage Galan 3T	V4.0 or later
Vantage Titan 3T	V1.35 or later
Vantage Orian	V4.5 or later
Vantage Fortian	V8.0 or later
Vantage Titan	V1.37 or later
Vantage Elan	V3.0 or later
EXCELART Vantage Atlas	V1.36

Second Console (Option)
MKDN-011A/S1
MKDN-012A/S1
MKDN-013A/S1, S2
MKDN-013B/S1, S2
MKDN-014A/S2

COMPOSITION

Software (License) 1 set

This package does not include an operation manual. Refer to the operation manual supplied with the MRI system.

PERFORMANCE SPECIFICATIONS

This package provides the following functions.

Diffusion

This is a technique for visualizing the microscopic diffusion (Brownian motion) of water molecules in the human body. This technique provides information on the speed and direction of water diffusion and on tissue characteristics such as viscosity. It is useful for the diagnosis of cerebral ischemia and other conditions. It is possible to perform calculations to generate an isotropic diffusion image and an isotropic ADC (Apparent Diffusion Coefficient) image automatically after completion of an examination that includes diffusion imaging.

FASE Diffusion

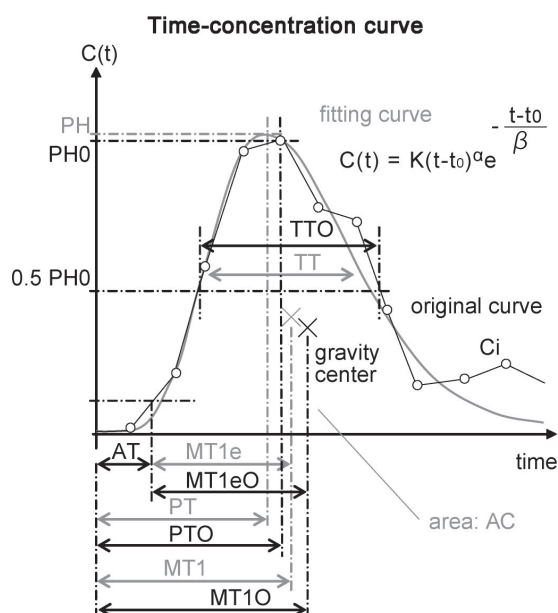
FASE diffusion produces diffusion-weighted images by adding an MPG (Motion Probing Gradient) pulse to a FASE sequence. Unlike EPI diffusion, this technique does not show image distortion due to regional changes in susceptibility. Imaging is possible for any plane.

Note: FASE Diffusion is not available for Vantage Titan 3T (V3.5 or earlier) and Vantage Elan (V3.0 and V3.1).

Dynamic Contrast Imaging (DCI)

- Dynamic scan is performed using FE EPI pulse sequences that enhance the susceptibility contrast, and hemodynamics (perfusion) is parameter-converted for each pixel based on the time-series image data and displayed as images.
 - The original time-series image data containing susceptibility contrast is converted to values representing the contrast medium concentrations, enabling qualitative observation of change of the hemodynamics over time in the left and right hemispheres.
 - By setting two or more ROIs on a susceptibility contrast image (ΔR_2^* image), a time intensity curve (TIC) is generated and the parameters that represent temporal characteristics (such as peak time of TIC, area under curve, primary moment, slope of curve rising edge and falling edge) are displayed as values or map, allowing comparison between left and right hemispheres.
- The TIC function can calculate the following parameters.

Parameter	Description
AT	Appearance time : Time at which the contrast medium appears on the image that is obtained from the original curve (s)
AC0	Area under curve of the original curve (1/s·s)
PH0	Peak height : Peak height of the original curve (c_u) = (1/s)
PT0	Peak time : Peak time of the original curve (s)
TT0	Peak width at half height obtained from the original curve (s)
MT10	Time of the center of gravity of the original curve (s)
MT1e0	Time from AT to the center of gravity of the original curve (s)
AC	Area under curve of the fitting curve (1/s·s)
PH	Peak height of the fitting curve (1/s)
PT	Peak time of the fitting curve (s)
TT	Transit time : Time between the point at which the gradient of the fitting curve is the maximum in the rising direction and the point at which the gradient of the fitting curve is the maximum in the falling direction (s)
MT1	Time of the center of gravity of the fitting curve (s)
MT1e	Time from AT to the center of gravity of the fitting curve (s)
US	Time at which the gradient of the fitting curve is the maximum (s)
Error	Fitting error
CBF	Regional cerebral blood flow obtained from the peak height of the impulse response (mL/100 g/min)
CBV	Regional cerebral blood volume obtained from the area under curve (mL/100 g)
MTT	Mean transit time obtained from CBV and CBF (s)
CBF2	Regional cerebral blood flow obtained from CBV and MTT2 (mL/100 g/min)
CBV2	Regional cerebral blood volume obtained from the area of the impulse response (mL/100 g)
MTT2	Mean transit time obtained from the width of the impulse response (s)
Tmax	Peak time of the impulse response (s)



Arterial Spin Labeling (ASL)

Using the ASL method, vascular images or perfusion-weighted images can be generated without contrast medium for both 2D and 3D. The ASL method labels the blood itself with the RF pulse and uses the magnetically labeled blood as a tracer to obtain vascular images or perfusion-weighted images in a relatively simple manner.

When ASL is used, images only of the flow components flowing into the imaging slice can be obtained. This is done by eliminating the stationary tissues by subtracting the tag image (which includes the contribution of the labeled flow) from the control image (which does not include the contribution of the labeled flow).

Note: 3D ASL is available for software V2.30 or later

To use this function for pCASL(pseudo-Continuous ASL), the pCASL Application(MSSW-PCASL) is required separately.

BOLD imaging

This is a technique for visualizing local areas in which the signal intensity changes when stimulation is applied to the patient using the BOLD effect and inflow effect. Motion correction, filtering, subtraction, t-test, and other types of arithmetic processing can also be performed using the postprocessing software installed in the system.

V-Trace

V-Trace combines the White Blood technique (based on the Time-of-Flight (TOF) technique, which uses the inflow effect) and the Black Blood (FSBB) technique (which uses the flow dephasing effect) to produce MRA images that depict blood vessels with a wide range of flow velocities. This technique makes it possible to observe smaller blood vessels.

JET

JET scan suppresses motion artifacts by acquiring data for the k-space in non-Cartesian mode. This technique can correct for motion (rotation and translation) and is useful for patients who cannot control their movements.

mVox

FASE3D mVox suppresses the signal decay due to tissue T2 relaxation and reduces the SAR level by varying the flip angle of the flop pulse for each echo, producing sharp images with suppressed blurring even with a small number of shots.

FSE3D Real IR

IR pulse and absolute-value reconstruction (real reconstruction) used in combination with T1-weighted FSE 3D sequences provides thin-slice images with high T1 contrast and good continuity in the slice direction.

Note: This function is available as standard from software V3.1 or later.
For Vantage Titan 3T, available as standard from software V2.50

SE-AFI

For FASE3D mVox and some FFE3D sequences, AFI can be applied in the slice encode direction to reduce the scan time. When AFI in the slice encode direction is applied for dynamic scanning, scanning with a high temporal resolution becomes available.

Note: This function is available for software V2.21 or later.
(It is available as standard from software V3.1 or later.
For Vantage Titan 3T, available as standard from software V2.50)

COS filter

Enhanced contrast images can be obtained using signal intensity and phase information in combination.

Note: This function is available for software V3.5 or later

Multi-b

Up to 15 different b-values can be selected for Diffusion Weighted Imaging. Isotropic Diffusion Weighted Images can be processed for each b-value.

Note: This function is available for software V3.5 or later

INSTALLATION CONDITIONS

The power and environmental conditions are the same as for the MRI system.

COMPLIANCE WITH STANDARDS

This package complies with the same standards as the MRI system.

MASS

Unit	Mass (kg)
mNeuro Package	Approx. 0.5

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