
Carousel INS

Delco Carousel IV-A Inertial Navigation System for *Microsoft Flight Simulator*

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Panel Integration Manual

This document explains how to install the Carousel IV-A gauges into a Flight Simulator panel. The user must have basic knowledge of panel.cfg syntax and Notepad program to use the information included here.

INS gauges do not normally substitute any gauge so building an INS-equipped panel is just a matter of adding INS gauges to an existing panel. This document tries to explain which gauges should be used and where they should be placed.

The system supports up to 3 INS units, identified as INS 1, INS 2 and INS 3, and each unit has its own set of gauges, plus there are few additional miscellaneous gauges. It is important to remember that INS 1 has priority over INS 2, and INS2 has priority over INS 3. Consequently, in a Single INS installation, INS 1 gauges must be used, in a Dual INS installation INS 1 and INS 2 gauges must be used. This is a simple rule which **MUST** be respected. Different configurations are not supported nor they will work.

Distribution Rules

When publishing a complete panel or simply a modified panel.cfg file using any gauge part of INS.GAU file, it is **NOT** allowed to include the INS archive into the distribution package. The package should only contain references to Internet location where the INS archive can be found.

Also, when patching an existing panel.cfg, make sure to get original author's authorization before publishing it.

gaugeXX= syntax

By design the main gauge file (.GAU) and all other related files are kept (and must be kept) under INS own folder named "Civa" under the main "root" of Flight Simulator installation path. For this reason the syntax of the "gaugeXX=" statement, within panel.cfg file, becomes a bit different, as it must include the relative path to reach INS.GAU file:

Normal syntax: gaugeXX=FileName!GaugeName, x, y, dx, dy, parameter(s)

INS syntax: gaugeXX=../**Civa**/FileName!GaugeName, x, y, dx, dy, parameter(s)

Configuration Files (.ISD)

The ISD files, to be found in the /Civa subfolder, is where the INS system stores all its own saved information.

By default the INS system (see "Config" gauge reference below) uses default.isd. The system also supports custom ISD file names in order to associate each panel (where the INS is installed) with a specific ISD file, so keeping saved data separated on a per-panel basis.

If specified .ISD file does not exist it will be automatically created by the INS system as soon as "Config" gauge is executed.

Gauges by INS Configuration

Gauges to be used in a Single INS installation:

Gauge Name	Mandatory/Suggested WindowID
Config	Window00
Msu1	Any
Cdu1	Any
Adeu1	Any, (Optional)
Cdu11	Any (optional)
Cdu12	Any (optional)
NavModeSingle	Any, 00 suggested
UpdateFlags	Any, 00 suggested
MsuPanellcon(B/L)	Any, 00 suggested (Optional)
CduPanellcon(B/L)	Any, 00 suggested (Optional)
AdeuPanellcon(B/L)	Any, 00 suggested (Optional)

Gauges to be used in a Dual INS installation:

Gauge Name	Mandatory/Suggested WindowID
Config	Window00
Msu1	Any
Msu2	Any
Cdu1	Any
Adeu1	Any, (Optional)
Cdu11	Any (optional)
Cdu12	Any (optional)
Cdu2	Any
Adeu2	Any, (Optional)
Cdu21	Any (optional)
Cdu22	Any (optional)
NavModeSingle/Dual	Any, 00 suggested
UpdateFlags	Any, 00 suggested
MsuPanellcon(B/L)	Any, 00 suggested (Optional)
CduPanellcon(B/L)	Any, 00 suggested (Optional)
AdeuPanellcon(B/L)	Any, 00 suggested (Optional)

Gauges to be used in a Triple INS installation:

Gauge Name	Mandatory/Suggested WindowID
Config	Window00
Msu1	Any
Msu2	Any
Msu3	Any
Cdu1	Any
Adeu1	Any, (Optional)
Cdu11	Any (optional)
Cdu12	Any (optional)
Cdu2	Any
Adeu2	Any, (Optional)
Cdu21	Any (optional)
Cdu22	Any (optional)
Cdu3	Any
Cdu31	Any (optional)
Cdu32	Any (optional)
NavModeTriple	Any, 00 suggested
UpdateFlags	Any, 00 suggested
BatParallel	Any
MsuPanellcon(B/L)	Any, 00 suggested (Optional)
CduPanellcon(B/L)	Any, 00 suggested (Optional)
AdeuPanellcon(B/L)	Any, 00 suggested (Optional)

Single Gauge Reference

The INS.GAU "multi-gauge" file includes the following gauges:

Config Gauge

Syntax: gaugeXX=../Civa/Ins!Config, x, y, dx, dy, NameOfTheConfigFile

Usage: MANDATORY

Window00: The gauge **MUST** be placed in the main [Window00] section of panel.cfg. The order is not important, it can be "appended" as the last gauge but, if there are other INS gauges within [Window00], then this gauge **MUST** be the first INS gauge to be defined.

This is a "system" gauge, used internally as a central reference point for the whole multi-INS system. It has no "user interface" so normally it's defined with 0,0,0,0 parameters.

It is possible (and suggested) to specify, as the fifth parameter in the gaugeXX= statement, the name of a configuration file (.ISD) the system will use to load/save data from/to. In this way each different INS installation can have its own separate configuration. ISD file which will be stored in the Civa folder. If not present, the system will automatically create it. Remember that only the name of the file should be specified, withOUT the .ISD extension.

Let's make an example:

Adding the gauge to the default 737 panel:

gaugeXX=../Civa/Ins!Config, 0, 0, 0, 0, Def_B737 (data will be kept in Def_B737.isd file)

MSU Gauges

There is one MSU for each INS unit installed so up to 3. In real aircrafts they are normally installed in the overhead panel. Optimal installation would be to place it/them there. If the panel does not come equipped with an overhead panel, they can be placed in a separate, dedicated "subpanel". It is not suggested to place them within the main panel because they are not used during flight, they would only take out precious space from the main view.

Note that MSUs bitmaps are identical and, when multiple MSUs are installed, there is no way to understand which INS unit they're connected to (so if a specific MSU is actually MSU 1 or MSU 2 or MSU 3).

MSU1 Gauge

Syntax: `gaugeXX=../Civa/Ins!Msu1, x, y, dx, dy`

Usage: **MANDATORY**

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 318 X 91 pixels, Ratio: 3.4945

This is the INS 1 Mode Select Unit gauge.

MSU2 Gauge

Syntax: `gaugeXX=../Civa/Ins!Msu2, x, y, dx, dy`

Usage: **To be used in Dual and Triple INS Configurations ONLY**

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 318 X 91 pixels, Ratio: 3.4945

This is the INS 2 Mode Select Unit gauge.

MSU3 Gauge

Syntax: `gaugeXX=../Civa/Ins!Msu3, x, y, dx, dy`

Usage: **To be used in Triple INS Configurations ONLY**

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 318 X 91 pixels, Ratio: 3.4945

This is the INS 3 Mode Select Unit gauge.

CDU Gauges

INS.GAU file includes 9 CDU gauges, 3 for each INS unit, to allow to have multiple CDUs (up to 3 in this case) around the main panel [Windows].

In real aircrafts they are normally installed in the center pedestal. Optimal installation would be to place it/them as part of a center pedestal replica (together with radios, throttles etc.) but in some cases it will be required to keep them in a separate window so that their

dimensions could be maintained large enough to have a fully readable gauge. Also the font used by Data and FromTo displays suddenly changes its appearance below a certain width, at that point the location of the various "dots" in both Data displays are no longer guaranteed to appear in the correct position.

Note that, as for MSUs, the CDUs bitmaps are identical and, when multiple CDUs are installed, there is no way to understand which INS unit they're connected to (so if a specific CDU is actually CDU 1 or CDU 2 or CDU 3). If identification labels are required then it is possible to build a bitmap where labels could be added, and use it as background image in the CDUs subpanel.

Normally in, a dual installation, CDUs are placed side by side, the left being INS 1 CDU, the right one INS 2 CDU, as figure 1 shows



figure 1

In triple configuration they should be placed as for the dual, with the third CDU placed centrally, below the others (T like shape, figure 2),

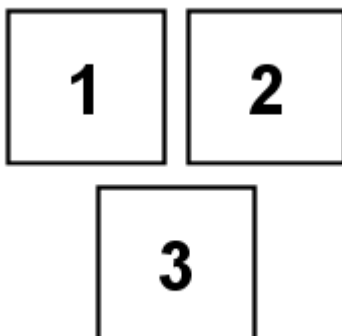


figure 2

or with CDU 3 moved between the other 2, but shifted downward (V like shape, figure 3), used to keep the CDUs subpanel less intrusive. It is always

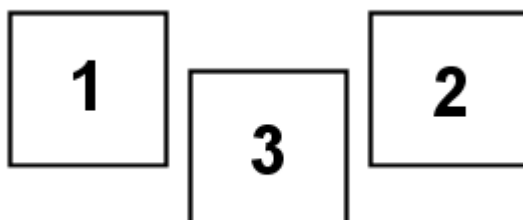


figure 3

important to correctly place CDU gauges in a panel, to minimize the chances of confusing the user. Figure 4 shows a clear example of a configuration to be avoided, at least if not

clearly labeled.



figure 4

INS1 CDU Gauges

Syntax: `gaugeXX=../Civa/Ins!Cdu1, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu11, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu12, x, y, dx, dy`

Usage: **MANDATORY** (install at least one of the 3 available)

WindowXX: Gauges can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 379 X 300 pixels, Ratio: 1.2633

These are the INS 1 Control and Display Unit gauges.

NOTE: It is NOT possible to define/include each gauge more than once.

INS 2 CDU Gauges

Syntax: `gaugeXX=../Civa/Ins!Cdu2, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu21, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu22, x, y, dx, dy`

Usage: **MANDATORY** (install at least one of the 3 available)

WindowXX: Gauges can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 379 X 300 pixels, Ratio: 1.2633

These are the INS 2 Control and Display Unit gauges.

NOTE: It is NOT possible to define/include each gauge more than once.

INS 3 CDU Gauges

Syntax: `gaugeXX=../Civa/Ins!Cdu3, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu31, x, y, dx, dy`
Syntax: `gaugeXX=../Civa/Ins!Cdu32, x, y, dx, dy`

Usage: **MANDATORY** (install at least one of the 3 available)

WindowXX: Gauges can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 379 X 300 pixels, Ratio: 1.2633

These are the INS 1 Control and Display Unit gauges.

NOTE: It is NOT possible to define/include each gauge more than once.

INS1 ADEU Gauge

Syntax: gaugeXX=../Civa/Ins!Adeu1, x, y, dx, dy

Usage: Optional

WindowXX: Gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 379 X 153 pixels, Ratio: 2.477

This is the main ADEU panel gauge which is connected to INS #1.

INS2 ADEU Gauge

Syntax: gaugeXX=../Civa/Ins!Adeu2, x, y, dx, dy

Usage: Optional

WindowXX: Gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 379 X 153 pixels, Ratio: 2.477

This is the main ADEU panel gauge which is connected to INS #2.

NavModeSingle Gauge

Syntax: gaugeXX=../Civa/Ins!NavModeSingle, x, y, dx, dy

Usage: To be used in Single INS Configurations ONLY

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 59 X 90 pixels, Ratio: 0.6556

This is the INS NAV Mode gauge with 1 switch to be used with single INS configurations. It could actually be used also to simulate aircrafts having a Dual INS configuration but only INS 1 is connected to the autopilot. INS 2 can only be used as reference, it cannot take control of the plane.

NavModeDual Gauge

Syntax: gaugeXX=../Civa/Ins!NavModeDual, x, y, dx, dy

Usage: To be used in Dual INS Configurations ONLY

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 100 X 90 pixels, Ratio: 1.1111

This is the INS NAV Mode gauge with 2 switches to be used with dual INS

configurations.

NavModeTriple Gauge

Syntax: gaugeXX=../Civa/Ins!NavModeTriple, x, y, dx, dy

Usage: To be used in Triple INS Configurations ONLY

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 150 X 90 pixels, Ratio: 1.6667

This is the INS NAV Mode gauge with 3 switches to be used with triple INS configurations.

UpdateFlags Gauge

Syntax: gaugeXX=../Civa/Ins!UpdateFlags, x, y, dx, dy

Usage: To be used in all INS Configurations

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 231 X 126 pixels, Ratio: 1.8333

This is the INS gauge including the two "DME Updating" flags. In single INS configurations the right flag (#2) is not operative. Use of this gauge is not mandatory as the DME Update status can be checked on the CDU FromTo display while in "DME Mode"

BatParallel Gauge

Syntax: gaugeXX=../Civa/Ins!BatParallel, x, y, dx, dy

Usage: To be used in Triple INS Configurations ONLY

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 152 X 190 pixels, Ratio: 0.8000

This is the INS BAT Parallel switch gauge, normally placed in one of the F/E panels.

MsuPanellcon Gauge

CduPanellcon Gauge

AdeuPanellcon Gauge

Gauges with name ending with 'B' are always Bright, those ending with 'L' are luminous, otherwise the third version is always "dark".

Syntax: gaugeXX=../Civa/Ins!MsuPanellcon, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!MsuPanellconB, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!MsuPanellconL, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!CduPanellcon, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!CduPanellconB, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!CduPanellconL, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!AdeuPanellcon, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!AdeuPanellconB, x, y, dx, dy, Window_Ident

Syntax: gaugeXX=../Civa/Ins!AdeuPanellconL, x, y, dx, dy, Window_Ident

Usage: **Optional**

WindowXX: The gauge can be placed in any [WindowXX] section of panel.cfg.

Main Bitmap: Dimensions: 19 X 19 pixels, Ratio: 1.0000

This is a "SimIcon" style gauge to be used to toggle a "subpanel" where MSUs/CDUs are installed if they have not been integrated into pre-existing subpanels. The window ident number specified as the fifth parameter, must match the "ident" value of the window the button has to toggle. Check already defined idents, within the same panel.cfg, to avoid conflicts.

Example:

3 MSUs are installed into window07 having ident set to 40 (note the value 40 is just an example, any ident could be used).

MsuPanellcon button, part of main window00, has been defined with the fifth parameter set to **40**, matching MSUs window ident.

[Window00]

.....

gauge42=../civa/INS!MsuPanellcon, 583, 276,14,14,**40**

[Window07]

size_mm=318,273

background_color=0,0,0

position=1

visible=0

ident=40

gauge00=../civa/INS!Msu1, 0, 0, 318, 91

gauge01=../civa/INS!Msu2, 0, 91, 318, 91

gauge02=../civa/INS!Msu3, 0, 182, 318, 91