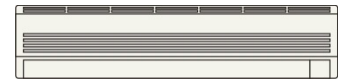




# The PanasonicVRF Driver

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The PanasonicVRF driver interfaces to a Panasonic or Sanyo variable refrigerant flow (VRF) air conditioning system. Compatible VRF systems include Panasonic ECOi, ECO G, and Sanyo AMY. Available for Commander and ObSys.

This document relates to PanasonicVRF driver version 1.0

Please read the *Commander Manual* or *ObSys Manual* alongside this document, available from [www.northbt.com](http://www.northbt.com)

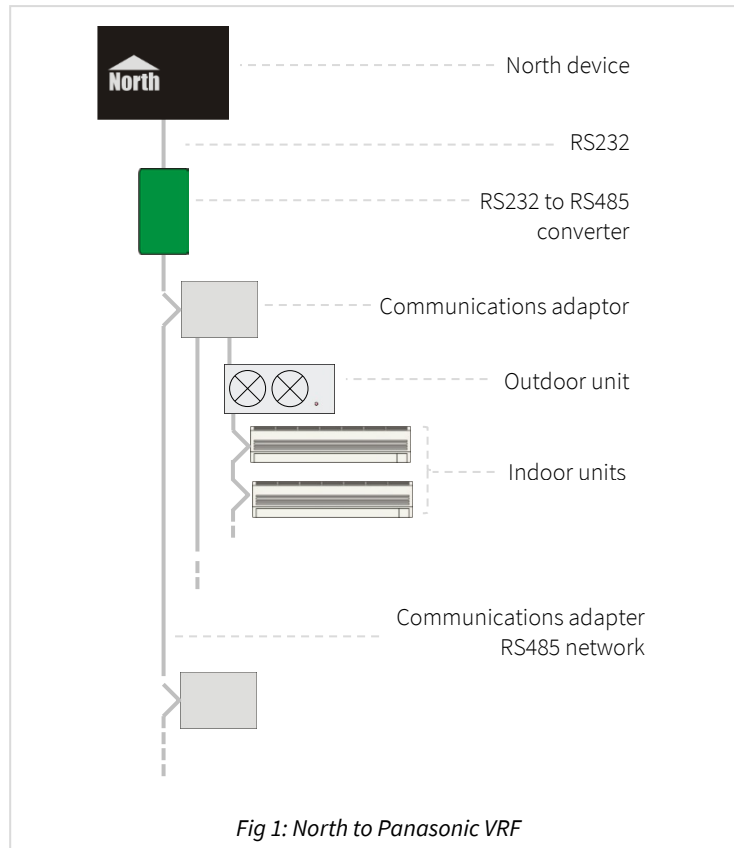
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# Compatibility with the Panasonic VRF System

The Panasonic VRF driver allows North to interface with a Panasonic or Sanyo variable refrigerant flow (VRF) air conditioning system. Compatible VRF systems include Panasonic ECOi, ECO G, and Sanyo AMY.

The driver connects, via an RS485 serial connection, to a network of Panasonic communication adapters (CZ-CFUNC2). Up to 5 communication adapters can be connected, with each supporting up to 128 indoor units (Fig. 1).



## Equipment

Panasonic VRF systems compatible with the driver include ECOi and ECO G ranges. A communications adaptor (CZ-CFUNC2) is required.

Sanyo VRF systems compatible with the driver include the AMY range. A communications adaptor (SHA-KA128AG) is required.

## Values

Each Panasonic indoor air conditioning unit typically has the following values available:

- On/off status
- Room temperature
- Operating mode
- Temperature Setpoint
- Fan speed
- Louvre position
- Alarm code

## Prerequisites

Each communications adaptor must be configured with an adapter number in the range 1 to 5, and a baud rate of 19200 or 9600 baud. Refer to Panasonic communications adaptor installation instructions.

An RS232-485 adapter is required and must be set to 19200 or 9600 baud, 11 bits.

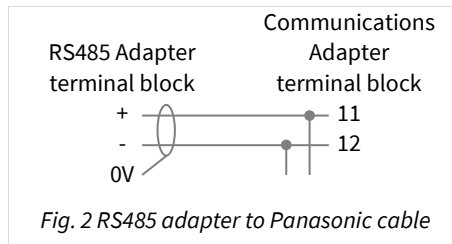
# Using the Driver

On ObSys and Commander, the PanasonicVRF driver is pre-installed. On all of these North devices, you can use the driver to create an interface to Panasonic. Once started, you will need to set up the driver before it can communicate with the Panasonic VRF system.

## Making the Cable

Connect the North device COM port to an RS232 to RS485 adapter.

Using the RS485 cable specification (Fig. 2), connect the RS485 adapter to the Panasonic communications adapter (P-link) network.



RS485 adapters are available from North, order code MISC/RS232/485.

## Starting the Interface

- 📖 To start an interface using the PanasonicVRF driver, follow these steps:
  - **Start Engineering** your North device using ObSys
  - Navigate to **Configuration, Interfaces**, and set a unused **Interface** to 'PanasonicVRF' to start the particular interface
  - Navigate to the top-level of your North device, then rescan it

The driver setup object (Mc), labelled **Panasonic Setup**, should now be available. If this object is not available, check an interface licence is available and the driver is installed.

## Setting up the Driver

- 📖 To set up the driver, follow these steps:
  - Navigate to the **Panasonic Setup** object (Mc). For example, if you started interface 1 with the driver earlier, then the object reference will be 'M1'
  - Set the **RS232 COM Port** object (RS.COM) to select which serial port number on the North device the Panasonic system is connected
  - Set the **RS232 Baud Rate** object (RS.BR) to match the baud rate of the Panasonic communication adapters. This is 19200 by default, but older systems may be set to 9600.

## Checking Communications

Wait for the **Connection Initialised** object (DS) to have the value 'yes'. This indicates the driver has connected with the communications adapter network. The **Indoor Units Available** object (US) reports when any connected indoor units are available.

You can check the interface is communicating by scanning the Panasonic System; all of the connected adapters should be available.

After powering-up, each communications adaptor can take 10 minutes to poll their connected equipment. During this time, the driver will be unable to communicate with the adapter.

If any errors are present on the Panasonic system during commissioning, then the driver may be unable to communicate with the adapter.

The driver will automatically re-discover the connected adapters every hour. To manually trigger a re-discovery of the connected adapters, set **Re-sync System** object (RST) with the value 'yes'.

# Object Specifications

Once an interface is started, one or more extra objects become available within the top-level object of the device. As with all North objects, each of these extra objects may contain sub-objects, (and each of these may contain sub-objects, and so on) - the whole object structure being a multi-layer hierarchy. It is possible to navigate around the objects using the ObSys Engineering Software.

Each object is specified below, along with its sub-objects.

## Example Object Reference

An example of a reference to an object in the same device: the Panasonic System (S1) contains Adaptor 1 Link 1 (A2), with Indoor Unit 2-1 (I2S1), which contains an Air Speed status (AF). Therefore, the complete object reference is 'S1.A2.I2S1.AF'.

An example of a reference to an object in a different device: the IP network object (IP) contains Default Commander object (CDIP), which contains the object above (S1.A2.I2S1.AF) - therefore the complete object reference is 'IP.CDIP.S1.A2.I2S1.AF'.

## Device Top-Level Objects

When an interface is started using the PanasonicVRF driver, the objects below become available within the top-level object of the device. For example, if interface 1 is started, then the object references 'M1' and 'S1' become available.

Description	Reference	Type
<b>Panasonic Setup</b> Set up the PanasonicVRF driver, started on interface <i>c</i> ( <i>c</i> is the interface number)	Mc	Fixed Container: On the Commander platform this will be <i>[CDM v20\PanasonicVRF v10]</i> On the ObSys platform this will be <i>[OSM v20\PanasonicVRF v10]</i>
<b>Panasonic System</b> Access Panasonic VRF system connected to interface <i>c</i> ( <i>c</i> is the interface number)	Sc	Variable Container: <i>[PanasonicVRF v10]</i>

# Panasonic Driver Setup

Object Type: [OSM v20\PanasonicVRF v10]

Object Type: [CDM v20\PanasonicVRF v10]

The PanasonicVRF driver contains the following objects:

Description	Reference	Type
<b>RS232 COM Port</b>	RS.COM	Obj\Num; Range: 1..8; Adjustable
<b>RS232 Baud Rate</b> New adapters are set to 19200 by default, however older installations may have been set to 9600 baud	RS.BR	Obj\Num: 9600 or 19200; Adjustable
<b>System Label</b>	DL	Obj\Text; Max. 20 chars; Adjustable
<b>Connection Initialised</b> Indicates the driver has completed scanning the communications adapters for attached indoor units	DS	Obj\NoYes
<b>Indoor Units Available</b> Indicates the driver has found indoor units connected	US	Obj\NoYes
<b>Re-sync System</b> Triggers a re-discovery of connected communications adapters and indoor units. The driver will perform an automatic re-sync every hour	RST	Obj\NoYes; Adjustable

# Panasonic System

Object Type: *[PanasonicVRF v10]*

Each Panasonic VRF system contains a network of communications adapters (CZ-CFUNC2). Each adapter uses two addresses based on the adapter number.

Description	Reference	Type
<b>Adapter <math>a</math> Link <math>b</math></b> Each adapter connects to two networks of indoor units, on link 1 and link 2. Each link is available using the object (Ay). The address, $y$ , can be in the range 2...11. Adapter $a$ Link 1 is at address $2 * a$ , and Adapter $a$ Link 2 at address $2 * a + 1$ . The adapter number, $a$ , is in the range 1...5. E.g. Adapter 1 Link 1 uses object A2, and adapter 1 Link 2 uses object A3	Ay	Variable Container: <i>[PanasonicVRF v10\Adapter]</i>

## Adapter Link

Object Type: *[PanasonicVRF v10\Adapter]*

Each Panasonic adaptor link provides access to a network of up to 64 indoor units.

Description	Reference	Type
Indoor Unit $y-z$ The indoor unit number, $y$ , can be in the range 1...64. The refrigerant circuit, $z$ , can be in the range 1...32.	lySz	Fixed Container: <i>[PanasonicVRF v10\Unit]</i>



# Indoor Unit

Object Type: [PanasonicVRF v10\Unit]

Each Panasonic indoor unit contains the following objects:

Description	Reference	Type
<b>Description</b> E.g. 'Adapter a Link b Unit y-z'	ID	Obj\Text
<b>Status</b>	S	Obj\OffOn; Adjustable
<b>Operating Mode</b> To set the unit to automatic mode write the value 4 or 5 (both have the same effect). On reading, value 4 and 5 indicate if the unit is cooling or heating whilst in automatic heating and cooling mode.	OP	Obj\Enum:0..5; Adjustable Value: 0=Fan, 1=Cooling, 2=Heating, 3=Dehumidify, 4=Auto (Cooling), 5=Auto (Heating)
<b>Temperature - Current Value (°C)</b>	T.V	Obj\Float: -34.0...92.0°C
<b>Temperature - Setpoint (°C)</b>	T.SP	Obj\Float: -34.0...92.0°C; Adjustable
<b>Fan speed</b>	AF	Obj\Enum: 0..3; Adjustable Value: 0=Low, 1=Medium, 2= High, 3=Auto
<b>Louver position</b>	L	Obj\Enum: 0..5 Value: 0=F1 (Horizontal), 1=F2, 2=F3, 3=F4, 4=F5 (Vertical), 5=Swing
<b>Error Code</b> See table below	FLT	Obj\Text: Max. 3 chars
<b>Error Code - as number</b> See table below	FLTB	Obj\Num: Range 0...255

## Error Codes

Error Code	Error Code as Number	Meaning
A00	0	(No error occurred)
A01	1	Engine oil pressure error
A02	2	Engine oil error
A03	3	Engine speed too high
A04	4	Engine speed too low
A05	5	Ignition power supply error
A06	6	Engine start failure
A07	7	Fuel gas valve error
A08	8	Engine stall/stop
A09	9	Engine overload
A10	10	High exhaust gas temperature
A11	11	Engine oil level error
A12	12	Throttle (stepping motor) failure
A13	13	Fuel gas adjustment valve failure
A14	14	Engine oil pressure switch failure
A15	15	Starter power supply output short-circuit
A16	16	Starter locked
A17	17	CT failure (starter current detection failure)
A18	18	---
A19	19	Wax 3 way valve trouble
A20	20	High cooling water temperature
A21	21	Abnormal cooling water level
A22	22	Cooling water pump overload
A23	23	Crank angle sensor trouble
A24	24	Cam angle sensor trouble
A25	25	Clutch Trouble
A26	26	Misfire

Error Code	Error Code as Number	Meaning
A27	27	Catalyst temp trouble
A28	28	Generator trouble
A29	29	Converter trouble
A30	30	Fuel gas pressure low
A31	31	---
C00	32	Unused
C01	33	Poor setting on Control Address (duplicated)
C02	34	Discord of number of units in central process control
C03	35	Mis-wiring of central process control
C04	36	Misconnection of central process control
C05	37	Transmission error of central process control
C06	38	Reception error of central process control
C12	44	Lump alarm by local adapter
C16	48	Poor transmission of the adapter to the unit
C17	49	Poor reception of the adapter from the unit
C18	50	Duplicated control addresses in the adapter
C19	51	Duplication of adapter addresses
C21	53	Non-volatile memory in the adapter is abnormal
C22	54	Poor setting of adapter address
C23	55	Faulty host terminal (software)
C24	56	Faulty host terminal (hardware)
C25	57	Abnormal processing of the host terminal
C26	58	Communication error in the host terminal
C31	63	Change of constitution (the adapter detects the change)
E00	64	Unused
E01	65	Poor reception of the signal on the remote controller
E02	66	Poor transmission of the signal on the remote controller
E03	67	Poor reception of the indoor unit from the remote controller (central process control)
E04	68	Poor reception of the indoor unit from the outdoor unit
E05	69	Poor transmission of the indoor unit to the outdoor unit
E06	70	Poor reception of the outdoor unit from the indoor unit
E07	71	Poor transmission of the outdoor unit to the indoor unit
E08	72	Duplicated setting of indoor unit's address
E09	73	Setting multiple master remote controllers
E11	75	Poor reception of the indoor unit from the signal output PCB
E12	76	No auto-address setting (auto address is in setting)
E13	77	Poor transmission of indoor unit to the remote controller
E14	78	Duplicated address of master indoor unit in group processing control
E15	79	Alarm for auto-address setting (number of indoor units is too small)
E16	80	Alarm for auto-address setting (number of indoor units is too large)
E17	81	Poor transmission from outdoor unit to indoor unit
E18	82	Poor communication of group processing control caused by mis-wiring
E23	87	Poor transmission of CCU to outdoor sub bus
E24	88	Poor reception of CCU from outdoor sub bus
E25	89	Poor setting of outdoor sub bus address (duplicated)
E26	90	Discord of number of outdoor sub bus units
E27	91	Mis-wiring of outdoor sub bus
E28	92	Misconnection of outdoor units
E29	93	Poor reception of outdoor serial
E30	94	Poor transmission of outdoor serial
F00	96	Unused
F01	97	Abnormal sensor for the inlet temp. E1 on the heat exchanger of the indoor unit
F02	98	Abnormal sensor for mid-point temp. E2 on the heat exchanger of the indoor unit
F03	99	Abnormal sensor for the outlet temp. E3 on the heat exchanger of the indoor unit
F04	100	Abnormal sensor for the outlet temperature of the PC compressor

Error Code	Error Code as Number	Meaning
F05	101	Abnormal sensor for the outlet temperature of the AC compressor
F06	102	Abnormal sensor for the inlet temp. on the heat exchanger of the outdoor unit
F07	103	Abnormal sensor for the outlet temp. on the heat exchanger of the outdoor unit
F08	104	Abnormal sensor for outdoor temperature
F09	105	Actuation of scroll compressor protective thermostat
F10	106	Abnormal sensor for suction temperature of indoor unit
F11	107	Abnormal sensor for discharge temperature of indoor unit
F13	108	Abnormal sensor for cooling water temperature
F14	110	Abnormal sensor for engine room temperature
F15	112	Abnormal sensor for suction and discharge gas
F16	114	Abnormal sensor for exhaust gas temperature
F19	115	Abnormal sensor for compressor bottom temperature
F21	117	Abnormal sensor for compressor 3 current
F22	118	Abnormal sensor for discharge gas temperature from compressor 3
F23	119	Abnormal sensor for refrigerant gas 2 temperature in the heat exchanger
F24	120	Abnormal sensor for liquid refrigerant 2 temperature in the heat exchanger
F25	121	Abnormal sensor for heat exchanger coil I temperature
F26	122	Abnormal sensor for heat exchanger coil 2 temperature
F27	123	Abnormal sensor for compressor 1 current
F28	124	Abnormal sensor for compressor 2 current
F29	125	Abnormal non-volatile memory (EEPROM) in indoor unit
F30	126	Abnormal timer (RTC)
F31	127	Abnormal non-volatile memory (EEPROM) in outdoor unit
H00	128	unused
H01	129	Incorrect current value for compressor 1 (over current)
H02	130	Incorrect current value for compressor 1 (locked compressor)
H03	131	CT sensor is dislocated from compressor 1 Short circuited
H04	132	Protective thermostat for scroll compressor 1
H05	133	Protective thermostat for scroll compressor 1 is slipped off
H06	134	Activation of low pressure switch
H07	135	No oil in compressor 1
H08	136	Incorrect connection of oil sensor 1
H09	137	Chattering of magnet switch 1 (Multi)
H10	138	Defective sensor for crank case heater 1
H11	139	Incorrect current value for compressor 2 (over current)
H12	140	Incorrect current value for compressor 2 (locked compressor)
H13	141	CT sensor is dislocated from compressor 2 (short circuit)
H14	142	Protective thermostat for scroll compressor 2
H15	143	Protective thermostat for scroll compressor 2 is dislocated.
H16	144	No oil in compressor 2
H17	145	Sensed unbalanced power voltage
H18	146	Chattering of magnet switch 1 (Espacio)
H19	147	Chattering of magnet switch 2
H20	148	Defective sensor for crank case heater 2
H21	149	Incorrect current value for compressor 3 (over current)
H22	150	Incorrect current value for compressor 3 (locked compressor)
H23	151	CT sensor is dislocated from compressor 3 (short circuited)
H24	152	Protective thermostat for scroll compressor 3
H25	153	Protective thermostat for scroll compressor 3 is slipped off.
H26	154	No oil in compressor 3
H27	155	Incorrect connection of oil sensor 2
H28	156	Incorrect connection of oil sensor 3
H29	157	Chattering of magnet switch 3
H30	158	Defective sensor for crank case heater 3
L00	192	Unused
L01	193	Incorrect address for indoor unit (No master indoor unit)

Error Code	Error Code as Number	Meaning
L02	194	Mismatch of indoor and outdoor units
L03	195	Setting plural master indoor units for group control
L04	196	Duplicate setting of system address (outdoor unit)
L05	197	Duplicate setting of priority indoor unit (for priority indoor unit)
L06	198	Duplicate setting of priority indoor unit (for other than priority indoor unit)
L07	199	Group control wiring to individually controlled indoor unit
L08	200	No Setting of indoor unit address
L09	201	No Setting of indoor unit capacity
L10	202	No Setting of outdoor unit capacity
L11	203	Mis-wiring of group control wire (Espacio)
L12	204	Discord of indoor unit's capacity (Multi)
L13	205	Poor setting of indoor unit's type
L14	206	Discord of power frequency (50,60Hz)
L15	207	Defective double duct bearing
P00	224	Unused
P01	225	Abnormal indoor fan motor
P02	226	Actuation of outdoor fan motor, protective thermostats for CM and AC
P03	227	High discharge temperature of compressor
P04	228	Actuation of high refrigerant pressure switch
P05	229	Reversed phase of the power source
P09	233	Poor connection of ceiling panel connector for indoor unit
P10	234	Actuation of indoor unit float switch
P15	239	No refrigerant gas
P17	241	Abnormal discharge gas temperature from compressor 2
P18	242	Abnormal discharge gas temperature from compressor 3
P20	244	Abnormally high refrigerant gas pressure
P21	245	Abnormal pressure difference in compressor oil
P30	254	Abnormal sub indoor units in group control (Centralized processing control detected the abnormality)
P31	255	Abnormal group control

# Driver Versions

Version	Build Date	Details
1.0	23/5/2014	Driver renamed to PanasonicVRF (previously Sanyo). Baud rate changed to 19200
1.0	23/10/2018	Improved automatic re-synchronisation with AMY, to detect indoor unit changes and reconnecting after a power outage.
1.0	29/10/2019	Baud rate now selectable for older installations. Driver object US added.

## Next Steps...

If you require help, contact support on 01273 694422 or visit [www.northbt.com/support](http://www.northbt.com/support)



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