

NASA Protocol

General

The indoor and outdoor unit of the EHS heat pump communicate via a protocol called "NASA".

Physical layer

The data is transmitted via a [RS-485](https://en.wikipedia.org/wiki/RS-485) link with 9600 baud (<https://en.wikipedia.org/wiki/Baud>), even parity (<https://en.wikipedia.org/wiki/Parity%20bit>) and one stop bit.

Connection to the physical layer via the [F1/F2 connector](#).

Another means to access and interact with the outdoor unit/controller is to use the F3/F4 connector. The difference with F1/F2 connector lies in the fact the line is not transporting RS-485, but an On-Off-Keyed (OOK) data line over a DC transmission line. This F3/F4 pair enables to power remote controllers.

Using a chip like THVD8000 (Texas Instruments) and especially an evaluation board THVD8000EVM, it is possible to plug a regular UART 9600 8E1 to send and receive data from the F3/F4 pair.

Protocol details

The indoor and outdoor units both regularly transmit their current status and sensor readings via so called "packets". Each packet contains metadata, like the sender and receiver address as well as the actual payload data, which is structured into "messages". Every packet can contain one or more messages.

Packet structure

Byte #	Description	Value	Note
0	Packet Start	0x32	
1, 2	Packet Size	16bit	(int)data[2]; size + 2 == data.size();
3	Source Address Class	Address Class Enum	Outdoor = 0x10, HTU = 0x11, Indoor = 0x20, ERV = 0x30, Diffuser = 0x35, MCU = 0x38, RMC = 0x40, WiredRemote = 0x50, PIM = 0x58, SIM = 0x59, Peak = 0x5A, PowerDivider = 0x5B, OnOffController = 0x60, WiFiKit = 0x62, CentralController = 0x65, DMS = 0x6A, JIGTester = 0x80, BroadcastSelfLayer = 0xB0, BroadcastControlLayer = 0xB1, BroadcastSetLayer = 0xB2, BroadcastCS = 0xB3, BroadcastControlAndSetLayer = 0xB3, BroadcastModuleLayer = 0xB4, BroadcastCSM = 0xB7, BroadcastLocalLayer = 0xB8, BroadcastCSML = 0xBF, Undefined = 0xFF
4	Source Channel	8bit	
5	Source Address	8bit	
6	Destination Address Class	Address Class Enum	See source Address class
7	Destination Channel	8bit	
8	Destination Address	8bit	
9	Packet Information	packetInformation = ((int)data[index] & 128) >> 7 == 1	
9	Protocol Version	protocolVersion = (uint8_t) (((int)data[index] & 96) >> 5);	
9	Retry Count	retryCount = (uint8_t) (((int)data[index] & 24) >> 3);	
10	Packet Type	packetType = (PacketType) (((int)data[index + 1] & 240) >> 4);	StandBy = 0 Normal = 1, Gathering = 2, Install = 3, Download = 4
10	Data Type	dataType = (DataType)((int)data[index + 1] & 15);	Undefined = 0, Read = 1, Write = 2, Request = 3, Notification = 4, Response = 5, Ack = 6, Nack = 7
11	Packet Number	8bit	Increasing packet number
12	Capacity (Number of Messages)	8bit	
13, 14	Message Number	messageNumber = (uint32_t)data[index] * 256U + (uint32_t)data[index + 1]; type = (MessageSetType) (((uint32_t)messageNumber & 1536) >> 9);	messageNumber as seen in the S-NET NASA.ptc file; type: Enum = 0 (1 byte payload), Variable = 1 (2 bytes payload), LongVariable = 2 (4 bytes payload), Structure = 3 (all following bytes until the end of the packet, minus 3 end bytes; when a packet contains a structure, it does not contain any other messages. Therefore the capacity will be 1.)
14 + 1, 14 + 2, ...	Message Payload	(size as derived from the Message Number)	
... ...	Iterate over Capacity to retrieve all messages		
-3, -2	CRC16 CCITT (XModem)	16bit	uint16_t crc_actual = crc16(data, 3, size - 4); uint16_t crc_expected = (int)data[data.size() - 3] << 8 \ (int)data[data.size() - 2];
-1	Packet End	0x34	

Thank you to lanwin, who implemented [esphome_samsung_ac](https://github.com/lanwin/esphome_samsung_ac/tree/main) (https://github.com/lanwin/esphome_samsung_ac/tree/main) and was the first to understand the structure of the NASA Messages.

Message Numbers

A complete overview of all NASA message numbers does not seem to be available. Some information can be found in file NASA.prc, which is part of the SNET Pro service software (https://s3.amazonaws.com/samsung-files/Tech_Files/SNET+Pro+and+SNET+Pro+2+Service+Software/Snet+Pro+v1.5.3.zip). Additional information is available in file NasaConst.java, which is part of the WiFiKit_Source.zip (https://opensource.samsung.com/uploadList?menuItem=home_appliances&classification1=airconditioners&classification2=control_solutions).

Below tables show the available information from these files in a concise layout:

NASA Message Numbers, general info

MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x0000		NASA_IM_MASTER_NOTIFY	
0x0004		NASA_INSPECTION_MODE	
0x0007		NASA_GATHER_INFORMATION	
0x0008		NASA_GATHER_INFORMATION_COUNT	
0x000A		NASA_ENABLEDOWNLOAD	
0x000D		NASA_DETECTION_TYPE	
0x000E		NASA_PEAK_LEVEL	
0x000F		NASA_PEAK_MODE	
0x0010		NASA_PEAK_CONTROL_PERIOD	
0x0011		NASA_POWER_MANUFACTURE	
0x0012		NASA_POWER_CHANNEL1_TYPE	
0x0013		NASA_POWER_CHANNEL2_TYPE	
0x0014		NASA_POWER_CHANNEL3_TYPE	
0x0015		NASA_POWER_CHANNEL4_TYPE	
0x0016		NASA_POWER_CHANNEL5_TYPE	
0x0017		NASA_POWER_CHANNEL6_TYPE	
0x0018		NASA_POWER_CHANNEL7_TYPE	
0x0019		NASA_POWER_CHANNEL8_TYPE	
0x001A		NASA_POWER_CHANNEL1_USED	
0x001B		NASA_POWER_CHANNEL2_USED	
0x001C		NASA_POWER_CHANNEL3_USED	
0x001D		NASA_POWER_CHANNEL4_USED	
0x001E		NASA_POWER_CHANNEL5_USED	
0x001F		NASA_POWER_CHANNEL6_USED	
0x0020		NASA_POWER_CHANNEL7_USED	
0x0021		NASA_POWER_CHANNEL8_USED	
0x0023		NASA_STANDBY_MODE	
0x0025	ENUM_AD_MULTI_TENANT_NO		WiFi Kit Multi Tenant No.
0x0202	VAR_AD_ERROR_CODE1	NASA_ERROR_CODE1	Error code
0x0203		NASA_ERROR_CODE2	
0x0204		NASA_ERROR_CODE3	
0x0205		NASA_ERROR_CODE4	
0x0206		NASA_ERROR_CODE5	
0x0207	VAR_AD_INSTALL_NUMBER_INDOOR	NASA_OUTDOOR_INDOORCOUNT	Number of indoor units conn
0x0208		NASA_OUTDOOR_ERVCOUNT	
0x0209		NASA_OUTDOOR_EHSCOUNT	
0x0210		NASA_NET_ADDRESS	
0x0211	VAR_AD_INSTALL_NUMBER MCU	NASA_OUTDOOR_MCUCOUNT	Number of connected MCUs
0x0213		NASA_DEMAND_SYNC_TIME	
0x0214		NASA_PEAK_TARGET_DEMAND	
0x0217		NASA_PNP_NET_ADDRESS	PNP only
0x0401	LVAR_AD_ADDRESS_MAIN	NASA_CONFIRM_ADDRESS	
0x0402	LVAR_AD_ADDRESS_RMC	NASA_RMCADDRESS	
0x0403		NASA_RANDOM_ADDRESS	
0x0406		NASA_ALL_POWER_CONSUMPTION_SET	Total instantaneous power consumption
0x0407		NASA_ALL_POWER_CONSUMPTION_CUMULATIVE	Total cumulative power cons
0x0408	LVAR_AD_ADDRESS_SETUP	NASA_SETUP_ADDRESS	
0x0409	LVAR_AD_INSTALL_LEVEL_ALL	NASA_ALL_REMOTE_LEVEL	
0x040A	LVAR_AD_INSTALL_LEVEL_OPERATION_POWER	NASA_LEVEL_POWER	
0x040B	LVAR_AD_INSTALL_LEVEL_OPERATION_MODE	NASA_LEVEL_OPMODE	
0x040C	LVAR_AD_INSTALL_LEVEL_FAN_MODE	NASA_LEVEL_FANSPEED	
0x040D	LVAR_AD_INSTALL_LEVEL_FAN_DIRECTION	NASA_LEVEL_AIRSWING	
0x040E	LVAR_AD_INSTALL_LEVEL_TEMP_TARGET	NASA_LEVEL_SETTEMP	
0x040F	LVAR_AD_INSTALL_LEVEL_KEEP_INDIVIDUAL_CONTROL	NASA_LEVEL_KEEP_ALTERNATIVE_MODE	
0x0410	I VAR AD INSTALL I FVFI OPERATION MODE ONLY	NASA I FVFI OPMODE I IMIT	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x0412	LVAR_AD_INSTALL_LEVEL_COOL_MODE_LOWER	NASA_LEVEL_COOL_LOW_TEMP_LIMIT	
0x0413	LVAR_AD_INSTALL_LEVEL_HEAT_MODE_UPPER	NASA_LEVEL_HEAT_HIGH_TEMP_LIMIT	
0x0414	LVAR_AD_INSTALL_LEVEL_HEAT_MODE_LOWER	NASA_LEVEL_HEAT_LOW_TEMP_LIMIT	
0x0415	LVAR_AD_INSTALL_LEVEL_CONTACT_CONTROL	NASA_LEVEL_OUT_POINT_INPUT	
0x0416	LVAR_AD_INSTALL_LEVEL_KEY_OPERATION_INPUT	NASA_LEVEL_KEY_INPUT	
0x0417	LVAR_AD_??	NASA_PNP_CONFIRM_ADDRESS	PNP only
0x0418	LVAR_AD_??	NASA_PNP_RANDOM_ADDRESS	PNP only
0x0419	LVAR_AD_??	NASA_PNP_SETUP_ADDRESS	PNP only
0x041B	LVAR_AD_??		
0x041C		NASA_POWER_CHANNEL1_ELECTRIC_VALUE	
0x041D		NASA_POWER_CHANNEL2_ELECTRIC_VALUE	
0x041E		NASA_POWER_CHANNEL3_ELECTRIC_VALUE	
0x041F		NASA_POWER_CHANNEL4_ELECTRIC_VALUE	
0x0420		NASA_POWER_CHANNEL5_ELECTRIC_VALUE	
0x0421		NASA_POWER_CHANNEL6_ELECTRIC_VALUE	
0x0422		NASA_POWER_CHANNEL7_ELECTRIC_VALUE	
0x0423		NASA_POWER_CHANNEL8_ELECTRIC_VALUE	
0x0434		NASA_PEAK_RATIO_CURRENT	
0x0435		NASA_PEAK_RATIO_POTENTIAL	
0x0436		NASA_PEAK_TOTAL_POWER	
0x0437		NASA_PEAK_CURRENT_TARGET_DEMAND	
0x0438		NASA_PEAK_FORCAST_DEMAND	
0x0439		NASA_PEAK_TOP_DEMAND	
0x043A		NASA_PEAK_TARGET_POWER	
0x043B		NASA_POWER_CHANNEL1_PULSEVALUE	
0x043C		NASA_POWER_CHANNEL2_PULSEVALUE	
0x043D		NASA_POWER_CHANNEL3_PULSEVALUE	
0x043E		NASA_POWER_CHANNEL4_PULSEVALUE	
0x043F		NASA_POWER_CHANNEL5_PULSEVALUE	
0x0440		NASA_POWER_CHANNEL6_PULSEVALUE	
0x0441		NASA_POWER_CHANNEL7_PULSEVALUE	
0x0442		NASA_POWER_CHANNEL8_PULSEVALUE	
0x0443		NASA_PEAK_SYNC_TIME	
0x0444		NASA_PEAK_CURRENT_DEMAND	
0x0445		NASA_PEAK_REAL_VALUE	
0x0448	LVAR_AD MCU PORT SETUP		
0x0600	STR_AD_OPTION_BASIC	NASA_PRODUCT_OPTION	
0x0601	STR_AD_OPTION_INSTALL	NASA_INSTALL_OPTION	
0x0602	STR_AD_OPTION_INSTALL_2	NASA_INSTALLOPTION2	
0x0603	STR_AD_OPTION_CYCLE	NASA_CYCLEOPTION	
0x0604		NASA_PBAOPTION	
0x0605	STR_AD_INFO_EQUIP_POSITION	NASA_NAME	
0x0607	STR_AD_ID_SERIAL_NUMBER	NASA_SERIAL_NO	OutdoorTableSerialNumber
0x0608	STR_AD_DBICODE_MICOM_MAIN	NASA_MICOM_CODE	OutdoorUnitMainDBCodeVe
0x060C	STR_AD_DBICODE EEPROM	NASA_EEPROM_CODE	OutdoorTableEEPROMDBC
0x0613		NASA_SIMPIM_SYNC_DATETIME	
0x0619		NASA_SIMPIM_PASSWORD	
0x061A	STR_AD_PRODUCT_MODEL_NAME	NASA_PRODUCT_MODEL_NAME	
0x061C	STR_AD_PRODUCT_MAC_ADDRESS		WiFi Kit MAC Address
0x061F	STR_AD_ID_MODEL_NAME		Model Name
0x2000		NASA_IM_MASTER	
0x2001		NASA_CHANGE_POLAR	
0x2002		NASA_ADDRESSING_ASSIGN_CONFIRM_ADDRESS	
0x2003		NASA_ADDRESSING	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x2006		NASA_CHANGE_CONTROL_NETWORK_STATUS	
0x2007		NASA_CHANGE_SET_NETWORK_STATUS	
0x2008		NASA_CHANGE_LOCAL_NETWORK_STATUS	
0x2009		NASA_CHANGE_MODULE_NETWORK_STATUS	
0x200A		NASA_CHANGE_ALL_NETWORK_STATUS	
0x200F	ENUM_NM_NETWORK_POSITINON_LAYER	NASA_LAYER	Enumeration Type
0x2010	ENUM_NM_NETWORK_TRACKING_STATE	NASA_TRACKING_RESULT	
0x2012	ENUM_NM_?		
0x2015	ENUM_NM_?		
0x2017		NASA_COMMU_MICOM_LED	
0x2018		NASA_COMMU_MICOM_BUTTON	
0x20FF	ENUM_NM_?		
0x22F7	VAR_NM_??		
0x22F8	VAR_NM_??		
0x22F9	VAR_NM_??		
0x22FA	VAR_NM_??		
0x22FB	VAR_NM_??		
0x22FC	VAR_NM_??		
0x22FD	VAR_NM_??		
0x22FE	VAR_NM_??		
0x22FF	VAR_NM_??		
0x2400	LVAR_NM_??	NASA_ALL_LAYER_DEVICE_COUNT	
0x2401	LVAR_NM_??		
0x24FB	LVAR_NM_??		
0x24FC	LVAR_NM_??		
0x4000	ENUM_IN_OPERATION_POWER	NASA_POWER	Indoor unit power on/off
0x4001	ENUM_IN_OPERATION_MODE	NASA_INDOOR_OPMODE	Indoor unit control mode
0x4002	ENUM_IN_OPERATION_MODE_REAL	NASA_INDOOR_REAL_OPMODE	Indoor unit current operator
0x4003	ENUM_IN_OPERATION_VENT_POWER	NASA_ERV_POWER	Ventilation operation mode
0x4004	ENUM_IN_OPERATION_VENT_MODE	NASA_ERV_OPMODE	
0x4006	ENUM_IN_??	NASA_FANSPEED	
0x4007	ENUM_IN_FAN_MODE_REAL		Indoor unit current air volum
0x4008	ENUM_IN_FAN_VENT_MODE	NASA_ERV_FANSPEED	Indoor unit current air volum
0x400F	ENUM_IN_??		
0x4010	ENUM_IN_??		
0x4011	ENUM_IN_LOUVER_HL_SWING	NASA_AIRFLOW_UPDOWN	Up and down wind direction setting/status
0x4012	ENUM_IN_LOUVER_HL_PART_SWING		Up and down wind direction setting/status
0x4015	ENUM_IN_??		
0x4018	ENUM_IN_??	NASA_USE_WIREDREMOTE	
0x4019	ENUM_IN_??	NASA_USE_DISCHARGE_TEMP	This value is a value that can be controlled by the upper controller
0x401B	ENUM_IN_??	NASA_USE_CENTUAL_CONTROL	Income from InstallOption in
0x4023	ENUM_IN_??	NASA_USE_SPI	
0x4024	ENUM_IN_??	NASA_USE_FILTER_WARNING_TIME	
0x4025		NASA_FILTER_CLEAN	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x4028	ENUM_IN_STATE_THERMO		Thermo On/Off
0x4029	ENUM_IN_??		
0x402A	ENUM_IN_??		
0x402B	ENUM_IN_??		
0x402D	ENUM_IN_??		
0x402E	ENUM_IN_STATE_DEFROST_MODE	NASA_INDOOR_DEFROST_STATUS	Defrost mode
0x402F	ENUM_IN_MTFC		
0x4031	ENUM_IN_??		
0x4035	ENUM_IN_??		
0x4038	ENUM_IN_STATE_HUMIDITY_PERCENT	NASA_HUMIDITY_PERCENT	
0x403D		NASA_CONTROL_OAINTAKE	
0x403E		NASA_USE_MDS	
0x403F		NASA_CONTROL_MDS	
0x4040		NASA_USE_HUMIDIFICATION	
0x4041		NASA_CONTROL_HUMIDIFICATION	
0x4042		NASA_CONTROL_AUTO_CLEAN	
0x4043	ENUM_IN_??	NASA_CONTROL_SPI	
0x4045		NASA_USE_SILENCE	
0x4046	ENUM_IN_SILENCE	NASA_CONTROL_SILENCE	Silence mode
0x4047	ENUM_IN_??		
0x4048	ENUM_IN_??		
0x404F	ENUM_IN_??		
0x4050		NASA_CONTROL_SILENCT	
0x4051	ENUM_IN_??		
0x4059	ENUM_IN_??		
0x405B		NASA_USE_OUTER_COOL	
0x405C		NASA_CONTROL_OUTER_COOL	
0x405D		NASA_USE_DESIRED_HUMIDITY	
0x405E		NASA_CONTROL_DESIRED_HUMIDITY	
0x405F	ENUM_IN_??		
0x4060	ENUM_IN_ALTERNATIVE_MODE	NASA_ALTERNATIVE_MODE	
0x4063		NASA_EHS_INDOOR_POWER	
0x4064		NASA_EHS_INDOOR_OPMode	
0x4065	ENUM_IN_WATER_HEATER_POWER	NASA_DHW_POWER	Water heater power
0x4066	ENUM_IN_WATER_HEATER_MODE	NASA_DHW_OPMode	Water heater mode
0x4067	ENUM_IN_3WAY_VALVE	NASA_DHW_VALVE	Hydro_3Way
0x4068	ENUM_IN_SOLAR_PUMP	NASA_SOLAR_PUMP	Hydro_SolarPump
0x4069	ENUM_IN_THERMOSTAT1		Hydro_ExternalThermostat
0x406A	ENUM_IN_THERMOSTAT2		Hydro_ExternalThermostat2
0x406B	ENUM_IN_??	NASA_SMART_GRID	
0x406C	ENUM_IN_BACKUP_HEATER		Backup heater mode
0x406D	ENUM_IN_OUTING_MODE	NASA_INDOOR_OUT_GOING	Outing mode
0x406E	ENUM_IN QUIET MODE		
0x406F	ENUM_IN_REFERENCE_EHS_TEMP	NASA_DHW_REFERENCE_TEMP	Hydro_ControlChoice_Room
0x4070	ENUM_IN_DISCHAGE_TEMP_CONTROL	NASA_DISCHARGE_TEMP_ENABLE	
0x4073	ENUM_IN_??		
0x4074	ENUM_IN_??		

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x4076	ENUM_IN_ROOM_TEMP_SENSOR		
0x4077	ENUM_IN_??		
0x407B	ENUM_IN_??		
0x407D	ENUM_IN_??		
0x407E	ENUM_IN_LOUVER_LR_SWING	NASA_AIRFLOW_LEFTRIGHT	Left and right wind direction settings/status
0x4085	ENUM_IN_??		
0x4086	ENUM_IN_??		
0x4087	ENUM_IN_BOOSTER_HEATER		Booster heater
0x4089	ENUM_IN_STATE_WATER_PUMP		Water pump
0x408A	ENUM_IN_2WAY_VALVE		
0x4093	ENUM_IN_FSV_2041		FSV Water Law Type Heater
0x4094	ENUM_IN_FSV_2081		FSV Water Law Type Coolir
0x4095	ENUM_IN_FSV_2091	NASA_USE_THERMOSTAT1	
0x4096	ENUM_IN_FSV_2092	NASA_USE_THERMOSTAT2	
0x4097	ENUM_IN_FSV_3011	NASA_ENABLE_DHW	
0x4098	ENUM_IN_FSV_3031	NASA_USE_BOOSTER_HEATER	
0x4099	ENUM_IN_FSV_3041		
0x409A	ENUM_IN_FSV_3042		
0x409B	ENUM_IN_FSV_3051		
0x409C	ENUM_IN_FSV_3061	NASA_USE_DHW_THERMOSTAT	
0x409D	ENUM_IN_FSV_3071		
0x409E	ENUM_IN_FSV_4011		
0x409F	ENUM_IN_FSV_4021		
0x40A0	ENUM_IN_FSV_4022		
0x40A1	ENUM_IN_FSV_4023		
0x40A2	ENUM_IN_FSV_4031		
0x40A3	ENUM_IN_FSV_4032		
0x40A4	ENUM_IN_FSV_5041		
0x40A5	ENUM_IN_FSV_5042		
0x40A6	ENUM_IN_FSV_5043		
0x40A7	ENUM_IN_FSV_5051		
0x40B1		NASA_DHW_OPMODE_SUPPORT	
0x40B4	ENUM_IN_FSV_5061		
0x40B5	ENUM_IN_??		
0x40BB	ENUM_IN_STATE_AUTO_STATIC_PRESSURE_RUNNING		
0x40BC	ENUM_IN_STATE_KEY_TAG	NASA_VACANCY_STATUS	Vacancy control
0x40BD	ENUM_IN_EMPTY_ROOM_CONTROL_USED	NASA_USE_VACANCY_STATUS	
0x40C0	ENUM_IN_FSV_4041		
0x40C1	ENUM_IN_FSV_4044		
0x40C2	ENUM_IN_FSV_4051		
0x40C3	ENUM_IN_FSV_4053		
0x40C4	ENUM_IN_WATERPUMP_PWM_VALUE		Water pump speed
0x40C5	ENUM_IN_THERMOSTAT_WATER_HEATER		Hydro_WaterHeaterThermo
0x40C6	ENUM_IN_??		
0x40C7		NASA_AHUPANEL_ENTHALPY_CONTROL	
0x40C8		NASA_AHUPANEL_DUTY_CONTROL	
0x40C9		NASA_AHUPANEL_SUMMERNIGHT_CONTROL	
0x40CA		NASA_AHUPANEL_CO2_CONTROL	
0x40CB		NASA_AHUPANEL_ENERGYMANAGE_CONTROL	
0x40CC		NASA_AHUPANEL_RA_SMOKE_DECTION_STATUS	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x40CE		NASA_AHUPANEL_RA_FAN_ONOFF_STATUS	
0x40CF		NASA_AHUPANEL_ERROR_STATUS	
0x40D0		NASA_AHUPANEL_HEATER_ONOFF_STATUS	
0x40D1		NASA_AHUPANEL_SA_FAN_ONOFF_STATUS	
0x40D2		NASA_AHUPANEL_SMOKE_DECTION_CONTROL	
0x40D5	ENUM_IN_ENTER_ROOM_CONTROL_USED		
0x40D6	ENUM_IN_ERROR_HISTORY_CLEAR_FOR_HASS		
0x40E3	ENUM_IN_??		
0x40E7	ENUM_IN_CHILLER_WATERLAW_SENSOR		DMV Chiller Option
0x40F7	ENUM_IN_CHILLER_WATERLAW_ON_OFF		
0x40FB	ENUM_IN_CHILLLER_SETTING_SILENT_LEVEL		
0x40FC	ENUM_IN_CHILLER_SETTING_DEMAND_LEVEL		
0x4101	ENUM_IN_CHILLER_EXT_WATER_OUT_INPUT		
0x4102	ENUM_IN_STATE_FLOW_CHECK		
0x4103	ENUM_IN_WATER_VALVE_1_ON_OFF		FCU Kit
0x4104	ENUM_IN_WATER_VALVE_2_ON_OFF		
0x4105	ENUM_IN_ENTHALPY_CONTROL_STATE		
0x4107	ENUM_IN_FSV_5033		
0x4108	ENUM_IN_TDM_INDOOR_TYPE		
0x410D	ENUM_IN_FREE_COOLING_STATE		
0x4113	ENUM_IN_3WAY_VALVE_2		
0x4117	ENUM_IN_??		
0x4118	ENUM_IN_ROOM_TEMP_SENSOR_ZONE2		
0x4119	ENUM_IN_OPERATION_POWER_ZONE1		
0x411A	ENUM_IN_FSV_4061		
0x411B	ENUM_IN_FSV_5081		
0x411C	ENUM_IN_FSV_5091		
0x411D	ENUM_IN_FSV_5094		
0x411E	ENUM_IN_OPERATION_POWER_ZONE2		Zone2 Normal Power
0x4123	ENUM_IN_PV_CONTACT_STATE		PV Control
0x4124	ENUM_IN_SG_READY_MODE_STATE		Smart Grid
0x4125	ENUM_IN_FSV_LOAD_SAVE		
0x4127	ENUM_IN_FSV_2093		
0x4128	ENUM_IN_FSV_5022		
0x412A	ENUM_IN_FSV_2094		
0x412D	ENUM_IN_FSV_LOAD_SAVE		
0x4147	ENUM_IN_GAS_LEVEL		
0x4149	ENUM_IN_DIFFUSER_OPERATION_POWER		
0x4201	VAR_IN_TEMP_TARGET_F	NASA_SET_TEMP	Indoor unit set temperature
0x4202	VAR_IN_??		
0x4203	VAR_IN_TEMP_ROOM_F	NASA_CURRENT_TEMP	Room Temperature
0x4204	VAR_IN_??	NASA_MODIFIED_CURRENT_TEMP	Temperature
0x4205	VAR_IN_TEMP_EVA_IN_F	NASA_EVA_IN_TEMP	Indoor Eva In Temperature
0x4206	VAR_IN_TEMP_EVA_OUT_F	NASA_EVA_OUT_TEMP	Indoor Eva Out Temperature
0x4207	VAR_IN_TEMP ELECTRIC_HEATER_F		Electric heater temperature
0x4208		NASA_EVA_INHOLE_TEMP	
0x4209	VAR_IN_??	NASA_SET_DISCHARGE	
0x420B	VAR_IN_TEMP_DISCHARGE	NASA_CURRENT_DISCHARGE	Indoor Discharge Temp(Duc)
0x420C	VAR_IN_??	NASA_INDOOR_OUTER_TEMP	
0x4211	VAR_IN_CAPACITY_REQUEST	NASA_INDOOR_CAPACITY	Capacity
0x4212	VAR_IN_CAPACITY_ABSOLUTE	NASA_INDOOR_ABSOLUTE_CAPACITY	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x4217	VAR_IN_EEV_VALUE_REAL_1	NASA_INODDR_CURRENT_EEV1	Current EEV development level
0x4218	VAR_IN_EEV_VALUE_REAL_2	NASA_INDOOR_CURRENT_EEV2	Current EEV2 development
0x4219	VAR_IN_??	NASA_INDOOR_CURRENT_EEV3	
0x421A		NASA_INDOOR_CURRENT_EEV4	
0x421B	VAR_IN_SENSOR_CO2_PPM		CO2 sensor detection ppm
0x4220		NASA_INDOOR_AIRCLEANFAN_CURRENT_RPM	
0x4229	VAR_IN_MODEL_INFORMATION	NASA_INDOOR_MODEL_INFORMATION	Indoor unit model information
0x422A	VAR_IN_TEMP_DISCHARGE_COOL_TARGET_F	NASA_COOL_SET_DISCHARGE	User limitation - Water Cool Temperature Max.
0x422B	VAR_IN_TEMP_DISCHARGE_HEAT_TARGET_F	NASA_HEAT_SET_DISCHARGE	
0x4235	VAR_IN_TEMP_WATER_HEATER_TARGET_F	NASA_INDOOR_DHW_SET_TEMP	DHW target temperature
0x4236	VAR_IN_TEMP_WATER_IN_F	NASA_INDOOR_WATER_IN_TEMP	Hydro_WaterIn
0x4237	VAR_IN_TEMP_WATER_TANK_F	NASA_INDOOR_DHW_CURRENT_TEMP	DHW tank current temperature
0x4238	VAR_IN_TEMP_WATER_OUT_F	NASA_INDOOR_WATER_OUT_TEMP	Hydro_WaterOut
0x4239	VAR_IN_TEMP_WATER_OUT2_F		Hydro_HeaterOut
0x423E	VAR_IN_??		
0x4247	VAR_IN_TEMP_WATER_OUTLET_TARGET_F	NASA_INDOOR_SETTEMP_WATEROUT	Hydro_WaterOutletTargetF
0x4248	VAR_IN_TEMP_WATER_LAW_TARGET_F		
0x424A	VAR_IN_FSV_1011	NASA_INDOOR_COOL_MAX_SETTEMP_WATEROUT	User limitation - Water Cool Temperature Max.
0x424B	VAR_IN_FSV_1012	NASA_INDOOR_COOL_MIN_SETTEMP_WATEROUT	
0x424C	VAR_IN_FSV_1021	NASA_INDOOR_COOL_MAX_SETTEMP_ROOM	User limitation - Room Cool Temperature Max.
0x424D	VAR_IN_FSV_1022	NASA_INDOOR_COOL_MIN_SETTEMP_ROOM	
0x424E	VAR_IN_FSV_1031	NASA_INDOOR_HEAT_MAX_SETTEMP_WATEROUT	User limitation - Water Heat Temperature Max.
0x424F	VAR_IN_FSV_1032	NASA_INDOOR_HEAT_MIN_SETTEMP_WATEROUT	
0x4250	VAR_IN_FSV_1041	NASA_INDOOR_HEAT_MAX_SETTEMP_ROOM	User limitation - Room heat Temperature Max.
0x4251	VAR_IN_FSV_1042	NASA_INDOOR_HEAT_MIN_SETTEMP_ROOM	
0x4252	VAR_IN_FSV_1051	NASA_DHW_MAX_SETTEMPLIMIT	User limitation - Hot Water Temperature Max.
0x4253	VAR_IN_FSV_1052	NASA_DHW_MIN_SETTEMPLIMIT	
0x4254	VAR_IN_FSV_2011		Water Law Auto heating am temperature - Max.
0x4255	VAR_IN_FSV_2012		
0x4256	VAR_IN_FSV_2021		Water Law (WL1-Floor) Temp auto heating - Max.
0x4257	VAR_IN_FSV_2022		
0x4258	VAR_IN_FSV_2031		Water Law (WL2-FCU) Temp auto heating - Max.
0x4259	VAR_IN_FSV_2032		
0x425A	VAR_IN_FSV_2051		
0x425B	VAR_IN_FSV_2052		
0x425C	VAR_IN_FSV_2061		
0x425D	VAR_IN_FSV_2062		
0x425E	VAR_IN_FSV_2071		
0x425F	VAR_IN_FSV_2072		
0x4260	VAR_IN_FSV_3021		DHW Heating mode - Max.
0x4261	VAR_IN_FSV_3022		
0x4262	VAR_IN_FSV_3023		DHW Heating mode - Start
0x4263	VAR_IN_FSV_3024		
0x4264	VAR_IN_FSV_3025		DHW Heating mode - DHW time
0x4265	VAR_IN_FSV_3026		
0x4266	VAR_IN_FSV_3032		DHW Booster heater - Delay
0x4267	VAR_IN_FSV_3033		
0x4268	VAR_IN_FSV_3034		
0x4269	VAR_IN_FSV_3043		
0x426A	VAR_IN_FSV_3044		Desinfection - Target temp.
0x426B	VAR_IN_FSV_3045		

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x426D	VAR_IN_FSV_4012		
0x426E	VAR_IN_FSV_4013		Heating mode - Heating Off
0x426F	VAR_IN_FSV_4014		
0x4270	VAR_IN_FSV_4024		
0x4271	VAR_IN_FSV_4025		
0x4272	VAR_IN_FSV_4033		
0x4273	VAR_IN_FSV_5011		
0x4274	VAR_IN_FSV_5012		Outing mode - Room Temp cooling Mode
0x4275	VAR_IN_FSV_5013		
0x4276	VAR_IN_FSV_5014		Outing mode- Indoor heating temperature
0x4277	VAR_IN_FSV_5015		
0x4278	VAR_IN_FSV_5016		
0x4279	VAR_IN_FSV_5017		
0x427A	VAR_IN_FSV_5018		Outing mode - Temperature heating WL2 water
0x427B	VAR_IN_FSV_5019		
0x427C	VAR_IN_FSV_5021		Economic DHW mode - Ter hot water Tank
0x427D	VAR_IN_FSV_5031		
0x427E	VAR_IN_FSV_5032		
0x427F	VAR_IN_TEMP_WATER_LAW_F		Hydro_WaterLawTargetF
0x4284	VAR_IN_??	NASA_INDOOR_POWER_CONSUMPTION	Indoor unit power consumpt
0x4286	VAR_IN_FSV_4042		
0x4287	VAR_IN_FSV_4043		
0x4288	VAR_IN_FSV_4045		
0x4289	VAR_IN_FSV_4046		
0x428A	VAR_IN_FSV_4052		
0x428C	VAR_IN_TEMP_MIXING_VALVE_F		Hydro_MixingValve
0x428D	VAR_IN_??		
0x4290	VAR_IN_??	NASA_AHUPANEL_TARGET_HUMIDITY	
0x4291		NASA_AHUPANEL_OA_DAMPER_TARGET_RATE	
0x4292	VAR_IN_??	NASA_AHUPANEL_RA_TEMP	
0x4293		NASA_AHUPANEL_RA_HUMIDITY	
0x4294	VAR_IN_??	NASA_AHUPANEL_EA_RATE	
0x4295		NASA_AHUPANEL_OA_TEMP	
0x4296	VAR_IN_??	NASA_AHUPANEL_OA_HUMIDITY	
0x4297	VAR_AHU_PANEL_SA_TEMP	NASA_AHUPANEL_SA_TEMP	
0x4298	VAR_AHU_PANEL_SA_HUMIDITY	NASA_AHUPANEL_SA_HUMIDITY	
0x4299		NASA_AHUPANEL_STATIC_PRESSURE	
0x429A	VAR_IN_??	NASA_AHUPANEL_MIXING_TEMP	
0x429B		NASA_AHUPANEL_MIXING_RATE	
0x429C	VAR_IN_??	NASA_AHUPANEL_POINT_STATUS	
0x429F	VAR_IN_FAN_CURRENT_RPM_SUCTION1		
0x42A1	VAR_IN_FAN_CURRENT_RPM_SUCTION2		
0x42A3	VAR_IN_FAN_CURRENT_RPM_SUCTION3		
0x42A5	VAR_IN_TEMP_PANEL_AIR_COOL1_F		
0x42A6	VAR_IN_TEMP_PANEL_AIR_COOL2_F		
0x42A7	VAR_IN_TEMP_PANEL_ROOM_COOL1_F		
0x42A8	VAR_IN_TEMP_PANEL_ROOM_COOL2_F		
0x42A9	VAR_IN_TEMP_PANEL_TARGET_COOL1_F		
0x42AA	VAR_IN_TEMP_PANEL_TARGET_COOL2_F		
0x42AB	VAR_IN_TEMP_PANEL_AIR_HEAT1_F		
0x42AC	VAR_IN_TEMP_PANEL_AIR_HEAT2_F		
0x42AD	VAR_IN_TEMP_PANEL_ROOM_HEAT1_F		
0x42AE	VAR_IN_TEMP_PANEL_ROOM_HEAT2_F		

MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x42B1	VAR_IN_MCC_GROUP_MODULE_ADDRESS		
0x42B2	VAR_IN_MCC_GROUP_MAIN		
0x42B3	VAR_IN_MCC_MODULE_MAIN		
0x42C2	VAR_IN_TEMP_EVA2_IN_F		Indoor Eva2 In temperature
0x42C3	VAR_IN_TEMP_EVA2_OUT_F		Indoor Eva2 Out Temperatu
0x42C4	VAR_IN_CHILLER_PHE_IN_P		Inlet pressure
0x42C5	VAR_IN_CHILLER_PHE_OUT_P		Outlet pressure
0x42C9	VAR_IN_CHILLER_EXTERNAL_TEMPERATURE		External sensor-Room temp
0x42CA	VAR_IN_MODULATING_VALVE_1		
0x42CB	VAR_IN_MODULATING_VALVE_2		
0x42CC	VAR_IN_MODULATING_FAN		
0x42CD	VAR_IN_TEMP_WATER_IN2_F		
0x42CE	VAR_IN_FSV_3046		DHW Desinfection - Max. op time
0x42CF	VAR_IN_ENTHALPY_SENSOR_OUTPUT		
0x42D0	VAR_IN_EXT_VARIABLE_DAMPER_OUTPUT		
0x42D1	VAR_IN_DUST_SENSOR_PM10_0_VALUE		
0x42D2	VAR_IN_DUST_SENSOR_PM2_5_VALUE		
0x42D3	VAR_IN_DUST_SENSOR_PM1_0_VALUE		
0x42D4	VAR_IN_TEMP_ZONE2_F		Idiom_RoomTemp_Zone2
0x42D6	VAR_IN_TEMP_TARGET_ZONE2_F		Zone2 Room Set Temp.
0x42D7	VAR_IN_TEMP_WATER_OUTLET_TARGET_ZONE2_F		Water Outlet2 Set Temp.
0x42D8	VAR_IN_TEMP_WATER_OUTLET_ZONE1_F		Zone1 WaterOut Temp
0x42D9	VAR_IN_TEMP_WATER_OUTLET_ZONE2_F		Zone2 WaterOut Temp
0x42DB	VAR_IN_FSV_5082		
0x42DC	VAR_IN_FSV_5083		
0x42DD	VAR_IN_FSV_5092		
0x42DE	VAR_IN_FSV_5093		
0x42E8	VAR_IN_FLOW_SENSOR_VOLTAGE		
0x42E9	VAR_IN_FLOW_SENSOR_CALC		Flow Sensor
0x42ED	VAR_IN_FSV_3081		
0x42EE	VAR_IN_FSV_3082		
0x42EF	VAR_IN_FSV_3083		
0x42F0	VAR_IN_FSV_5023		
0x42F1	VAR_OUT_COMP_FREQ_RATE_CONTROL		
0x4301	VAR_IN_??		
0x4302	VAR_IN_CAPACITY_VENTILATION_REQUEST		
0x4401	LVAR_IN_??		
0x4405		NASA_GROUPCONTROL_BIT1	
0x4406		NASA_GROUPCONTROL_BIT2	
0x4407		NASA_GROUPCONTROL_BIT3	
0x440A	LVAR_IN_DEVICE_STAUS_HEATPUMP_BOILER		Switch_Hyrdoflow
0x440E	LVAR_IN_??		
0x440F	LVAR_IN_??	NASA_ERROR_INOUT	
0x4415	LVAR_IN_AUTO_STATIC_PRESSURE		
0x4418	LVAR_IN_EMPTY_ROOM_CONTROL_DATA	NASA_VACANCY_SETTING	
0x441B	LVAR_IN_ENTER_ROOM_CONTROL_DATA		
0x441F	LVAR_INETO_COOL_CONTROL_DATA		
0x4420	LVAR_INETO_HEAT_CONTROL_DATA		
0x4423	LVAR_IN_??		Minutes since installation
0x4424	LVAR_IN_??		Minutes active
0x4426	LVAR_IN_??		Generated power last minut
0x4427	LVAR_IN_??		Total generated power
0x4604	STR_IN_INSTALL_INDOOR_SETUP_INFO	NASA_INDOOR_ABLE_FUNCTION	
0x4608		NASA_INDOOR_SETTING_MIN_MAX_TEMP	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x4619		NASA_EHS_SETTING_MIN_MAX_TEMP	
0x461A		NASA_EHS_FSV_SETTING_MIN_MAX_TEMP	
0x461C		NASA_AHUPANEL_AHUKIT_ADDRESS	
0x461D		NASA_AHUPANEL_PANEL_OPTION	
0x461E	STR_IN_ERROR_HISTORY_FOR_HASS		Structure Type
0x8000	ENUM_OUT_OPERATION_SERVICE_OP		Indoor unit defrost operation
0x8001	ENUM_OUT_OPERATION_ODU_MODE	NASA_OUTDOOR_OPERATION_STATUS	Outdoor Driving Mode
0x8002	ENUM_OUT_??		
0x8003	ENUM_OUT_OPERATION_HEATCOOL	NASA_OUTDOOR_OPERATION_MODE	Outdoor unit cooling/heating
0x8005	ENUM_OUT_??		
0x800D	ENUM_OUT_??		
0x8010	ENUM_OUT_LOAD_COMP1	NASA_OUTDOOR_COMP1_STATUS	Comp#1 On/Off
0x8011	ENUM_OUT_LOAD_COMP2	NASA_OUTDOOR_COMP2_STATUS	Comp#2 On/Off
0x8012	ENUM_OUT_LOAD_COMP3	NASA_OUTDOOR_COMP3_STATUS	Comp#3 On/Off
0x8013	ENUM_OUT_LOAD_CCH1	NASA_OUTDOOR_CCH1_STATUS	CCH1 On/Off
0x8014	ENUM_OUT_LOAD_CCH2	NASA_OUTDOOR_CCH2_STATUS	CCH2 On/Off
0x8015		NASA_OUTDOOR_CCH3_STATUS	
0x8016		NASA_OUTDOOR_ACCUMULATOR_CCH	
0x8017	ENUM_OUT_LOAD_HOTGAS	NASA_OUTDOOR_HOTGAS1	HotGas1 On/Off
0x8018	ENUM_OUT_LOAD_HOTGAS2	NASA_OUTDOOR_HOTGAS2	HotGas2 On/Off
0x8019	ENUM_OUT_LOAD_LIQUID	NASA_OUTDOOR_LIQUID_BYPASS_VALVE	Liquid On/Off
0x801A	ENUM_OUT_LOAD_4WAY	NASA_OUTDOOR_4WAY_VALVE	4Way On/Off
0x801F	ENUM_OUT_LOAD_MAINCOOL	NASA_OUTDOOR_MAIN_COOL_VALVE	
0x8020	ENUM_OUT_LOAD_OUTEEV	NASA_OUTDOOR_OD_EEV_VALVE	
0x8021	ENUM_OUT_LOAD_EVI_BYPASS	NASA_OUTDOOR_EVI_BYPASS_VALVE	EVI ByPass On/Off
0x8022	ENUM_OUT_LOAD_EVI_SOL1	NASA_OUTDOOR_EVI_SOL1_VALVE	EVI Sol1 On/Off
0x8023	ENUM_OUT_LOAD_EVI_SOL2	NASA_OUTDOOR_EVI_SOL2_VALVE	EVI Sol2 On/Off
0x8024		NASA_OUTDOOR_EVI_SOL3_VALVE	
0x8025	ENUM_OUT_LOAD_GASCHARGE	NASA_OUTDOOR_GAS_CHARGE	Hot Gas Charging
0x8026	ENUM_OUT_LOAD_WATER	NASA_OUTDOOR_WATER_VALVE	2Way Valve
0x8027	ENUM_OUT_LOAD_PUMPOUT	NASA_OUTDOOR_PUMPOUT_VALVE	Pump Out
0x802A	ENUM_OUT_LOAD_4WAY2	NASA_OUTDOOR_4WAY2_VALVE	
0x8031	ENUM_OUT_??		
0x8032	ENUM_OUT_??		
0x8033	ENUM_OUT_??		
0x8034	ENUM_OUT_LOAD_LIQUIDTUBE	NASA_OUTDOOR_LIQUID_TUBE_VALVE	Liquid tube
0x8037	ENUM_OUT_LOAD_ACCRETURN	NASA_OUTDOOR_ACCUM_RETURN_VALVE	ARV On/Off
0x803B	ENUM_OUT_LOAD_FLOW_SWITCH	NASA_OUTDOOR_FLOW_SWITCH	Flow Switch
0x803C	ENUM_OUT_OPERATION_AUTO_INSPECT_STEP		Automatic check step
0x803F	ENUM_OUT_??		
0x8043	ENUM_OUT_??		
0x8045	ENUM_OUT_??		

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x8047	ENUM_OUT_??	NASA_OUTDOOR_SERVICEOPERATION	
0x8048	ENUM_OUT_??		
0x8049	ENUM_OUT MCU LOAD_COOL_A		MCU
0x804A	ENUM_OUT MCU LOAD_HEAT_A		
0x804B	ENUM_OUT MCU LOAD_COOL_B		
0x804C	ENUM_OUT MCU LOAD_HEAT_B		
0x804D	ENUM_OUT MCU LOAD_COOL_C		
0x804E	ENUM_OUT MCU LOAD_HEAT_C		
0x804F	ENUM_OUT MCU LOAD_COOL_D		
0x8050	ENUM_OUT MCU LOAD_HEAT_D		
0x8051	ENUM_OUT MCU LOAD_COOL_E		
0x8052	ENUM_OUT MCU LOAD_HEAT_E		
0x8053	ENUM_OUT MCU LOAD_COOL_F		
0x8054	ENUM_OUT MCU LOAD_HEAT_F		
0x8055	ENUM_OUT MCU LOAD_LIQUID		
0x8058	ENUM_OUT MCU_PORT0_INDOOR_ADDR		
0x8059	ENUM_OUT MCU_PORT1_INDOOR_ADDR		
0x805A	ENUM_OUT MCU_PORT2_INDOOR_ADDR		
0x805B	ENUM_OUT MCU_PORT3_INDOOR_ADDR		
0x805C	ENUM_OUT MCU_PORT4_INDOOR_ADDR		
0x805D	ENUM_OUT MCU_PORT5_INDOOR_ADDR		
0x805E	ENUM_OUT_??		
0x8061	ENUM_OUT_DEICE_STEP_INDOOR	NASA_OUTDOOR_INDOOR_DEFROST_STEP	Indoor unit defrost operation
0x8062		NASA_OUTDOOR_LOGICAL_DEFROST_STEP	
0x8063	ENUM_OUT_??		
0x8065		NASA_OUTDOOR_SYSTEM_RESET	
0x8066	ENUM_OUT_??	NASA_OUTDOOR_OPMODELIMIT	
0x8077	ENUM_OUT_??		
0x8078	ENUM_OUT_??		
0x8079	ENUM_OUT_??		
0x807A	ENUM_OUT_??		
0x807B	ENUM_OUT_??		
0x807C	ENUM_OUT_??		
0x807D	ENUM_OUT_??		
0x807E	ENUM_OUT_??		
0x807F	ENUM_OUT_??		
0x8081	ENUM_OUT_??	NASA_OUTDOOR_EXT_CMD_OPERATION	
0x8083	ENUM_OUT_??		
0x808C	ENUM_OUT_??		
0x808D	ENUM_OUT_??		
0x808E	ENUM_OUT_OP_CHECK_REF_STEP		Refrigerant amount level
0x808F	ENUM_OUT_??		
0x8092	ENUM_OUT_INSTALL_ODU_COUNT		
0x8099	ENUM_OUT_CONTROL_FAN_NUM		Number of outdoor fans
0x809C	ENUM_OUT_CHECK_REF_RESULT		Refrigerant amount determination result

MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x809E	ENUM_OUT_LOAD_CBOX_COOLING_FAN	NASA_OUTDOOR_CBOX_COOLING_FAN	DC Fan
0x80A5	ENUM_OUT_STATE_BACKUP_OPER	NASA_OUTDOOR_BACKUP_OPERATION	Backup operation operation On/Off
0x80A6	ENUM_OUT_STATE_COMP_PROTECT_OPER	NASA_OUTDOOR_COM_PROTECT_OPERATION	Compressor protection cont operation status On/Off
0x80A7	ENUM_OUT_??	NASA_OUTDOOR_DRED_LEVEL	
0x80A8	ENUM_OUT_??		
0x80A9	ENUM_OUT_??		
0x80AA	ENUM_OUT_??		
0x80AB	ENUM_OUT_??		
0x80AC	ENUM_OUT_??	NASA_OUTDOOR_ACCUM_RETURN2_VALVE	
0x80AE	ENUM_OUT_??		
0x80AF	ENUM_OUT_LOAD_BASEHEATER	NASA_OUTDOOR_BASE_HEATER	Base heater On/Off state for
0x80B1	ENUM_OUT_??		
0x80B2	ENUM_OUT_??	NASA_OUTDOOR_CH_SWITCH_VALUE	
0x80B4	ENUM_OUT_STATE_ACCUM_VALVE_ONOFF		
0x80B6	ENUM_OUT_??		
0x80B8	ENUM_OUT_LOAD_OIL_BYPASS1		
0x80B9	ENUM_OUT_LOAD_OIL_BYPASS2		
0x80BC	ENUM_OUT_??		
0x80BE	ENUM_OUT_OP_A2_CURRENTMODE		
0x80C1	ENUM_OUT_LOAD_A2A_VALVE		
0x80CE	ENUM_OUT_??		
0x80D7	ENUM_OUT_LOAD_PHEATER		
0x80D8	ENUM_OUT_EHS_WATEROUT_TYPE		
0x8200	VAR_OUT_??	NASA_OUTDOOR_OPMODE_OPTION	
0x8201	VAR_OUT_??		
0x8202	VAR_OUT_INSTALL_COMP_NUM		Number of outdoor unit com
0x8204	VAR_OUT_SENSOR_AIROUT	NASA_OUTDOOR_OUT_TEMP	Outdoor temperature
0x8206	VAR_OUT_SENSOR_HIGHPRESS	NASA_OUTDOOR_HIGH_PRESS	High pressure
0x8208	VAR_OUT_SENSOR_LOWPRESS	NASA_OUTDOOR_LOW_PRESS	low pressure
0x820A	VAR_OUT_SENSOR_DISCHARGE1	NASA_OUTDOOR_DISCHARGE_TEMP1	Discharge1
0x820C	VAR_OUT_SENSOR_DISCHARGE2	NASA_OUTDOOR_DISCHARGE_TEMP2	Discharge2
0x820E	VAR_OUT_SENSOR_DISCHARGE3	NASA_OUTDOOR_DISCHARGE_TEMP3	Discharge3
0x8210		NASA_OUTDOOR_SUMPTEMP	
0x8217	VAR_OUT_SENSOR_CT1	NASA_OUTDOOR_CT1	Compressor 1 current
0x8218	VAR_OUT_SENSOR_CONDOUT	NASA_OUTDOOR_COND_OUT1	Main heat exchanger outlet temperature
0x821A	VAR_OUT_SENSOR_SUCTION	NASA_OUTDOOR_SUCTION1_TEMP	Suction temperature
0x821C	VAR_OUT_SENSOR_DOUBLETUBE	NASA_OUTDOOR_DOUBLE_TUBE	Liquid pipe temperature
0x821E	VAR_OUTCD_SENSOR_EVIIN	NASA_OUTDOOR_EVI_IN	EVI IN
0x8220	VAR_OUT_SENSOR_EVIOUT	NASA_OUTDOOR_EVI_OUT	EVI OUT
0x8222	VAR_OUT_??	NASA_OUTDOOR_OLP_TEMP	
0x8223	VAR_OUT_CONTROL_TARGET_DISCHARGE	NASA_OUTDOOR_TARGET_DISCHARGE	Target discharge temperatur
0x8224	VAR_OUT_??		Temperature
0x8225	VAR_OUT_??		Temperature
0x8226	VAR_OUT_LOAD_FANSTEP1	NASA_OUTDOOR_FAN_STEP1	Outdoor Fan Step
0x8227	VAR_OUT_??	NASA_OUTDOOR_FAN_STEP2	
0x8228		NASA_OUTDOOR_LOADINGTIME	
0x8229	VAR_OUT_LOAD_OUTEEV1	NASA_OUTDOOR_MAINEEV1	Main EEV1

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x822A	VAR_OUT_LOAD_OUTEEV2	NASA_OUTDOOR_MAINEEV2	Main EEV2
0x822B	VAR_OUT_LOAD_OUTEEV3	NASA_OUTDOOR_MAINEEV3	Main EEV3
0x822C	VAR_OUT_LOAD_OUTEEV4	NASA_OUTDOOR_MAINEEV4	Main EEV4
0x822D	VAR_OUT_LOAD_OUTEEV5	NASA_OUTDOOR_MAINEEV5	Main EEV5
0x822E	VAR_OUT_LOAD_EVIEEV	NASA_OUTDOOR_EVIEEV	EVI EEV
0x822F		NASA_OUTDOOR_HREEV	
0x8230	VAR_OUT_??	NASA_OUTDOOR_RUNNING_SUM_CAPA	
0x8231	VAR_OUT_??	NASA_OUTDOOR_HEATING_PERCENT	
0x8233	VAR_OUT_??	NASA_OUTDOOR_OPERATION_CAPA_SUM	
0x8234	VAR_OUT_??		
0x8235	VAR_OUT_ERROR_CODE		HTU error code
0x8236	VAR_OUT_CONTROL_ORDER_CFREQ_COMP1	NASA_OUTDOOR_COMP1_ORDER_HZ	Instruction frequency 1
0x8237	VAR_OUT_CONTROL_TARGET_CFREQ_COMP1	NASA_OUTDOOR_COMP1_TARGET_HZ	Target frequency 1
0x8238	VAR_OUT_CONTROL_CFREQ_COMP1	NASA_OUTDOOR_COMP1_RUN_HZ	Current frequency 1
0x8239	VAR_OUT_??		
0x823B	VAR_OUT_SENSOR_DCLINK_VOLTAGE	NASA_OUTDOOR_DCLINK1_VOLT	DC Link1 (Inverter DC voltage)
0x823C			
0x823D	VAR_OUT_LOAD_FANRPM1	NASA_OUTDOOR_FAN_RPM1	Outdoor Fan1 RPM
0x823E	VAR_OUT_LOAD_FANRPM2	NASA_OUTDOOR_FAN_RPM2	Outdoor Fan2 RPM
0x823F	VAR_OUT_??	NASA_OUTDOOR_CONTROL_PRIME_UNIT	
0x8240		NASA_OUTDOOR_ODU_CAPA1	current electric capacity of odu1
0x8241		NASA_OUTDOOR_ODU_CAPA2	
0x8243	VAR_OUT_??		
0x8244		NASA_OUTDOOR_OIL_RECOVERY_STEP	
0x8245		NASA_OUTDOOR_OIL_BALANCE_STEP	
0x8247	VAR_OUT_??	NASA_OUTDOOR_DEFROST_STEP	
0x8248	VAR_OUT_??	NASA_OUTDOOR_SAFETY_START	
0x8249	VAR_OUT_??		
0x824B	VAR_OUT_??		
0x824C	VAR_OUT_??		
0x824F	VAR_OUT_CONTROL_REFRIGERANTS_VOLUME		Refrigerant amount
0x8254	VAR_OUT_SENSOR_IPM1	NASA_OUTDOOR_IPM_TEMP1	IPM1 Temperature
0x8255	VAR_OUT_SENSOR_IPM2	NASA_OUTDOOR_IPM_TEMP2	IPM2 Temperature
0x825A	VAR_OUT_??		
0x825B	VAR_OUT_??		
0x825C	VAR_OUT_??		
0x825D	VAR_OUT_??		
0x825E	VAR_OUT_SENSOR_TEMP_WATER	NASA_OUTDOOR_WATER_TEMP	Water Temperature
0x825F	VAR_OUT_SENSOR_PIPEIN1		
0x8260	VAR_OUT_SENSOR_PIPEIN2		
0x8261	VAR_OUT_SENSOR_PIPEIN3		
0x8262	VAR_OUT_SENSOR_PIPEIN4		
0x8263	VAR_OUT_SENSOR_PIPEIN5		

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x8265	VAR_OUT_SENSOR_PIPEOUT2		
0x8266	VAR_OUT_SENSOR_PIPEOUT3		
0x8267	VAR_OUT_SENSOR_PIPEOUT4		
0x8268	VAR_OUT_SENSOR_PIPEOUT5		
0x826B	VAR_OUT MCU SENSOR SUBCOOLER_IN		
0x826C	VAR_OUT MCU SENSOR SUBCOOLER_OUT		
0x826D	VAR_OUT MCU SUBCOOLER_EEV		
0x826E	VAR_OUT MCU CHANGE_OVER_EEV1		
0x826F	VAR_OUT MCU CHANGE_OVER_EEV2		
0x8270	VAR_OUT MCU CHANGE_OVER_EEV3		
0x8271	VAR_OUT MCU CHANGE_OVER_EEV4		
0x8272	VAR_OUT MCU CHANGE_OVER_EEV5		
0x8273	VAR_OUT MCU CHANGE_OVER_EEV6		
0x8274	VAR_OUT CONTROL ORDER CFREQ COMP2	NASA_OUTDOOR_COMP2_ORDER_HZ	Instruction frequency 2
0x8275	VAR_OUT CONTROL TARGET CFREQ COMP2	NASA_OUTDOOR_COMP2_TARGET_HZ	Target frequency 2
0x8276	VAR_OUT CONTROL CFREQ COMP2	NASA_OUTDOOR_COMP2_RUN_HZ	Current frequency 2
0x8277	VAR_OUT SENSOR CT2	NASA_OUTDOOR_CT2	Compressor 2 current
0x8278	VAR_OUT SENSOR OCT1	NASA_OUTDOOR_OCT1	Compressor OCT1
0x8279		NASA_OUTDOOR_OCT2	
0x827A	VAR_OUT CONTROL DSH1		Just for EHS HTU
0x827E		NASA_OUTDOOR_ODU_CAPA3	
0x827F		NASA_OUTDOOR_ODU_CAPA4	
0x8280	VAR_OUT SENSOR TOP1	NASA_OUTDOOR_TOP_SENSOR_TEMP1	Top1
0x8281	VAR_OUT SENSOR TOP2	NASA_OUTDOOR_TOP_SENSOR_TEMP2	Top2
0x8282		NASA_OUTDOOR_TOP_SENSOR_TEMP3	
0x8287	VAR_OUT INSTALL CAPA	NASA_OUTDOOR_HP	Outdoor unit horsepower
0x8298		NASA_OUTDOOR_COOL_SUM_CAPA	
0x829A	VAR_OUT SENSOR SUCTION2_1SEC	NASA_OUTDOOR_SUCTION2_TEMP	
0x829B		NASA_OUTDOOR_CT_RESTRICT_OPTION	
0x829C		NASA_OUTDOOR_COMPENSATE_COOL_CAPA	
0x829D		NASA_OUTDOOR_COMPENSATE_HEAT_CAPA	
0x829F	VAR_OUT SENSOR SAT TEMP HIGH PRESSURE	NASA_OUTDOOR_HIGH_PRESS_TEMP	High pressure saturation ter
0x82A0	VAR_OUT SENSOR SAT TEMP LOW PRESSURE	NASA_OUTDOOR_LOW_PRESS_TEMP	Low pressure saturation ter
0x82A2	VAR_OUT_??		
0x82A3		NASA_OUTDOOR_CT3	
0x82A4		NASA_OUTDOOR_OCT3	
0x82A6		NASA_OUTDOOR_FAN_IPM1_TEMP	
0x82A7		NASA_OUTDOOR_FAN_IPM2_TEMP	
0x82A8	VAR_OUT CONTROL IDU TOTAL ABSCAPA		
0x82A9	undefined		
0x82AF	VAR_OUT INSTALL COND_SIZE		
0x82B2	VAR_OUT_??		
0x82B3		NASA_OUTDOOR_DCLINK2_VOLT	
0x82B5	VAR_OUT_??		
0x82B6	VAR_OUT_??		
0x82B8	VAR_OUT SENSOR MIDPRESS	NASA_OUTDOOR_MID_PRESS	medium pressure
0x82B9		NASA_OUTDOOR_FAN_CT1	
0x82BA		NASA_OUTDOOR_FAN_CT2	
0x82BC	VAR_OUT_PROJECT_CODE	NASA_OUTDOOR_PROJECT_CODE	Project code
0x82BD	VAR_OUT_LOAD_FLUX_VARIABLE_VALVE	NASA_OUTDOOR_FLUX_VARIABLE_VALVE	Flow Control
0x82BE	VAR_OUT_SENSOR_CONTROL_BOX	NASA_OUTDOOR_CBOX_TEMP	Contor Box Temp
0x82BF	VAR_OUT_SENSOR_CONDOUT2	NASA_OUTDOOR_COND_OUT2	Sub heat exchanger outlet t
0x82C0		NASA_OUTDOOR_COMP3_ORDER_HZ	
0x82C1		NASA_OUTDOOR_COMP3_TARGET_HZ	
0x82C2		NASA_OUTDOOR_COMP3_RUN_HZ	

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x82C4		NASA_OUTDOOR_IPM_TEMP3	
0x82C8	VAR_OUT_SENSOR_ACCUM_TEMP	NASA_OUTDOOR_ACCUM_TEMP	Accumulator outlet temperature
0x82C9	VAR_OUT_SENSOR_ENGINE_WATER_TEMP	NASA_OUTDOOR_ENGINE_WATER_TEMP	Engine water temperature
0x82CA	VAR_OUT_OIL_BYPASS_VALVE	NASA_OUTDOOR_OIL_BYPASS_VALVE	Oil Bypass Valve
0x82CB	VAR_OUT_SUCTION_OVER_HEAT	NASA_OUTDOOR_SUCTION_OVER_HEAT	Suction superheat
0x82CC	VAR_OUT_SUB_COND_OVER_HEAT	NASA_OUTDOOR_SUB_COND_OVER_HEAT	Sub heat exchanger outlet saturation degree
0x82CD	VAR_OUT_OVER_COOL	NASA_OUTDOOR_OVER_COOL	Outdoor unit supercooling
0x82CE	VAR_OUT_COND_OVER_COOL	NASA_OUTDOOR_COND_OVER_COOL	Outdoor heat exchanger saturation degree
0x82CF	VAR_OUT_ENGINE_RPM	NASA_OUTDOOR_ENGINE_RPM	Engine RPM
0x82D0	VAR_OUT_APPEARANCE_RPM	NASA_OUTDOOR_APPEARANCE_RPM	Appearance RPM
0x82D1	VAR_OUT_??		
0x82D2	VAR_OUT_SUB_COND_EEV_STEP	NASA_OUTDOOR_SUB_COND_EEV_STEP	Sub EEV
0x82D3		NASA_OUTDOOR_SNOW_LEVEL	
0x82D4	VAR_OUT_??		
0x82D5		NASA_OUTDOOR_UPL_TP_COOL	
0x82D6		NASA_OUTDOOR_UPL_TP_HEAT	
0x82D9	VAR_OUT_??		
0x82DA	VAR_OUT_??		
0x82DB	VAR_OUT_PHASE_CURRENT	NASA_OUTDOOR_PHASE_CURRENT	Phase current value
0x82DC	VAR_OUT_??		
0x82DD	VAR_OUT_??		
0x82DE	VAR_OUT_SENSOR_EVAIN	NASA_OUTDOOR_EVA_IN	Eva In for EHS
0x82DF	VAR_OUT_SENSOR_TW1	NASA_OUTDOOR_TW1_TEMP	Water In 1 for EHS
0x82E0	VAR_OUT_SENSOR_TW2	NASA_OUTDOOR_TW2_TEMP	Water In 2 for EHS
0x82E1	VAR_OUT_??		
0x82E3	VAR_OUT_PRODUCT_OPTION_CAPA		Outdoor unit product option (based on 0.1Kw) for EHS
0x82E7	VAR_OUT_SENSOR_TOTAL_SUCTION		Total Suction Sensor
0x82E8	VAR_OUT_LOAD MCU_HR_BYPASS_EEV		MCU HR Bypass EEV open diagram
0x82E9	VAR_OUT_SENSOR_PFCM1		PFCM#1 element temperature
0x82ED	VAR_OUT_??		
0x82F5	VAR_OUT_HIGH_OVERLOAD_DETECT		PFCM#1 element temperature
0x82F6	VAR_OUT_??		
0x82F9	VAR_OUT_SENSOR_SUCTION3_1SEC		Suction3 temperature
0x82FC	VAR_OUT_LOAD_EVI_SOL_EEV		EVI SOL EEV
0x82FD	VAR_OUT_??		
0x8401	LVAR_OUT_??		
0x8404	LVAR_OUT_??		
0x8405	LVAR_OUT_LOAD_COMP1_RUNNING_TIME	NASA_OUTDOOR_COMP1_RUNNING_TIME	OutdoorTableCompressorRunTime1
0x8406	LVAR_OUT_??	NASA_OUTDOOR_COMP2_RUNNING_TIME	OutdoorTableCompressorRunTime2
0x8408	LVAR_OUT_??		
0x8409	LVAR_OUT_??		
0x840B	LVAR_OUT_AUTO_INSPECT_RESULT0		
0x840C	LVAR_OUT_AUTO_INSPECT_RESULT1		
0x840E		NASA_OUTDOOR_COMP3_RUNNING_TIME	
0x8411	LVAR_OUT_??	NASA_OUTDOOR_CONTROL_WATTMETER_1UNIT	Instantaneous power consumption of outdoor unit. One outdoor unit is used by the controller.
0x8412		NASA_OUTDOOR_CONTROL_WATTMETER_1UNIT_ACCUM	Cumulative power consumption of outdoor unit. One outdoor unit is used by the controller.
0x8413	LVAR_OUT_CONTROL_WATTMETER_1W_1MIN_SUM	NASA_OUTDOOR_CONTROL_WATTMETER_ALL_UNIT	Outdoor unit instantaneous consumption Sum of modbus

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MsgNr	Label (NASA.prc)	Label (NasaConst.java)	Description
0x8414	LVAR_OUT_??	NASA_OUTDOOR_CONTROL_WATTMETER_ALL_UNIT_ACCUM	Outdoor unit cumulative power consumption. Sum of modul
0x8415	LVAR_OUT_??	NASA_OUTDOOR_CONTROL_WATTMETER_TOTAL_SUM	Total (indoor + outdoor) instant power consumption
0x8416	LVAR_OUT_??	NASA_OUTDOOR_CONTROL_WATTMETER_TOTAL_SUM_ACCUM	Total (indoor + outdoor) current power consumption
0x8417	LVAR_OUT_??	NASA_OUTDOOR_VARIABLE_SETUP_INFO	
0x841A	LVAR_OUT_??		
0x841F	LVAR_OUT_??		
0x8601	STR_OUT_INSTALL_INVERTER_AND_BOOTLOADER_INFO	NASA_OUTDOOR_SUBMICOM	Structure Type
0x8608	STR_OUT_??		Structure Type
0x860A	STR_OUT_BASE_OPTION		Structure Type
0x860C	STR_OUT_??		Structure Type
0x860D	STR_OUT_INSTALL_MODEL_INFO	NASA_OUTDOOR_MODELINFORMATION	Structure Type
0x860F	STR_OUT_INSTALL_OUTDOOR_SETUP_INFO	NASA_OUTDOOR_SETUP_INFO	Structure Type
0x8613	STR_OUT_REF_CHECK_INFO		Structure Type

NASA Message Numbers, detailed info

MsgNr	Type	Signed	Unit	Arithmetic
0x0000				
0x0004				
0x0007				
0x0008				
0x000A				
0x000D				
0x000E				
0x000F				
0x0010				
0x0011				
0x0012				
0x0013				
0x0014				
0x0015				
0x0016				
0x0017				
0x0018				
0x0019				
0x001A				
0x001B				
0x001C				
0x001D				
0x001E				
0x001F				
0x0020				
0x0021				
0x0023				
0x0025	ENUM			
0x0202	VAR	false		
0x0203				
0x0204				
0x0205				
0x0206				
0x0207	VAR	false		
0x0208				
0x0209				
0x0210				
0x0211	VAR	false		
0x0213				
0x0214				
0x0217				
0x0401	LVAR	false		
0x0402	LVAR	false		
0x0403				
0x0406				
0x0407				
0x0408	LVAR	false		
0x0409	LVAR	false		
0x040A	LVAR	false		
0x040B	LVAR	false	LogicalAnd 0xFF	
0x040C	LVAR	false		
0x040D	LVAR	false		
0x040E	LVAR	false		
0x040F	LVAR	false		
0x0410	LVAR	false		

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MsgNr	Type	Signed	Unit	Arithmetic
0x0412	LVAR	false	Celsius	(value & 0xFFFF0000u) >> 16) / 10.0;
0x0413	LVAR	false	Celsius	(value & 0xFFFF0000u) >> 16) / 10.0;
0x0414	LVAR	false	Celsius	(value & 0xFFFF0000u) >> 16) / 10.0;
0x0415	LVAR	false		
0x0416	LVAR	false		
0x0417	LVAR			
0x0418	LVAR			
0x0419	LVAR			
0x041B	LVAR			
0x041C				
0x041D				
0x041E				
0x041F				
0x0420				
0x0421				
0x0422				
0x0423				
0x0434				
0x0435				
0x0436				
0x0437				
0x0438				
0x0439				
0x043A				
0x043B				
0x043C				
0x043D				
0x043E				
0x043F				
0x0440				
0x0441				
0x0442				
0x0443				
0x0444				
0x0445				
0x0448	LVAR	false		
0x0600	STR			
0x0601	STR			
0x0602	STR			
0x0603	STR			
0x0604				
0x0605	STR			
0x0607	STR			null terminated string, first byte is = first Char
0x0608	STR			
0x060C	STR			
0x0613				
0x0619				
0x061A	STR			null terminated string, first byte is = byte(length of string)
0x061C	STR			
0x061F	STR			
0x2000				
0x2001				
0x2002				
0x2003				
0x2004	ENUM			
0x2006				

MsgNr	Type	Signed	Unit	Arithmetic
0x2008				
0x2009				
0x200A				
0x200F	ENUM			
0x2010	ENUM			
0x2012	ENUM			
0x2017				
0x2018				
0x22F7	VAR			
0x22F9	VAR			
0x22FA	VAR			
0x22FB	VAR			
0x22FC	VAR			
0x22FD	VAR			
0x22FE	VAR			
0x22FF	VAR			
0x2400	LVAR			
0x2401	LVAR			
0x24FB	LVAR			
0x24FC	LVAR			
0x4000	ENUM			
0x4001	ENUM			
0x4002	ENUM			
0x4003	ENUM			
0x4004	ENUM			
0x4006	ENUM			
0x4007	ENUM			
0x4008	ENUM			
0x400F	ENUM			
0x4010	ENUM			
0x4011	ENUM			
0x4012	ENUM			
0x4015	ENUM			
0x4018	ENUM			
0x4019	ENUM			
0x401B	ENUM			
0x4023	ENUM			
0x4024	ENUM			
0x4025				
0x4027	ENUM			
0x4028	ENUM			
0x4029	ENUM			
0x402A	ENUM			
0x402B	ENUM			
0x402D	ENUM			
0x402E	ENUM			
0x402F	ENUM			
0x4031	ENUM			
0x4035	ENUM			
0x4038	ENUM			
0x403D				
0x403E				
0x403F				
0x4040				
0x4041				
0x4042				

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MsgNr	Type	Signed	Unit	Arithmetic
0x4045				
0x4046	ENUM			
0x4047	ENUM			
0x4048	ENUM			
0x404F	ENUM			
0x4050				
0x4051	ENUM			
0x4059	ENUM			
0x405B				
0x405C				
0x405D				
0x405E				
0x405F	ENUM			
0x4060	ENUM			
0x4063				
0x4064				
0x4065	ENUM			
0x4066	ENUM			
0x4067	ENUM			
0x4068	ENUM			
0x4069	ENUM			
0x406A	ENUM			
0x406B	ENUM			
0x406C	ENUM			
0x406D	ENUM			
0x406E	ENUM			
0x406F	ENUM			
0x4070	ENUM			
0x4073	ENUM			
0x4074	ENUM			
0x4076	ENUM			0 means no temp sensor, 1 means temp sensor present.
0x4077	ENUM			
0x407B	ENUM			
0x407D	ENUM			
0x407E	ENUM			
0x4085	ENUM			
0x4086	ENUM			
0x4087	ENUM			
0x4089	ENUM			
0x408A	ENUM			
0x4093	ENUM			
0x4094	ENUM			
0x4095	ENUM			
0x4096	ENUM			
0x4097	ENUM			
0x4098	ENUM			
0x4099	ENUM			
0x409A	ENUM			
0x409B	ENUM			
0x409C	ENUM			
0x409D	ENUM			
0x409E	ENUM			
0x409F	ENUM			
0x40A0	ENUM			
0x40A1	ENUM			
0x40A2	ENUM			

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MsgNr	Type	Signed	Unit	Arithmetic
0x40A4	ENUM			
0x40A5	ENUM			
0x40A6	ENUM			
0x40A7	ENUM			
0x40B1				
0x40B4	ENUM			
0x40B5	ENUM			
0x40BB	ENUM			
0x40BC	ENUM			
0x40BD	ENUM			
0x40C0	ENUM			
0x40C1	ENUM			
0x40C2	ENUM			
0x40C3	ENUM			
0x40C4	ENUM		[%]	
0x40C5	ENUM			
0x40C6	ENUM			
0x40C7				
0x40C8				
0x40C9				
0x40CA				
0x40CB				
0x40CC				
0x40CD				
0x40CE				
0x40CF				
0x40D0				
0x40D1				
0x40D2				
0x40D5	ENUM			
0x40D6	ENUM			
0x40E3	ENUM			
0x40E7	ENUM			
0x40F7	ENUM			
0x40FB	ENUM			
0x40FC	ENUM			
0x4101	ENUM			
0x4102	ENUM			
0x4103	ENUM			
0x4104	ENUM			
0x4105	ENUM			
0x4107	ENUM			
0x4108	ENUM			
0x410D	ENUM			
0x4113	ENUM			
0x4117	ENUM			
0x4118	ENUM			0 means no temp sensor, 1 means temp sensor present.
0x4119	ENUM			
0x411A	ENUM			
0x411B	ENUM			
0x411C	ENUM			
0x411D	ENUM			
0x411E	ENUM			
0x4123	ENUM			
0x4124	ENUM			
0x4125	ENUM			

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MsgNr	Type	Signed	Unit	Arithmetic
0x4128	ENUM			
0x412A	ENUM			
0x412D	ENUM			
0x4147	ENUM			
0x4149	ENUM			
0x4201	VAR	true	Celsius	division by 10
0x4202	VAR	true	Celsius	division by 10
0x4203	VAR	true	Celsius	division by 10
0x4204	VAR	true	Celsius	division by 10
0x4205	VAR	true	Celsius	division by 10
0x4206	VAR	true	Celsius	division by 10
0x4207	VAR	true	Celsius	subtract 55
0x4208				
0x4209				
0x420B	VAR	true	Celsius	division by 10
0x420C	VAR	true	Celsius	division by 10
0x4211	VAR	false	kW	division by 8.6
0x4212	VAR	false	kW	division by 8.6
0x4213	VAR			
0x4217	VAR	false		
0x4218	VAR	false		
0x4219				
0x421A				
0x421B	VAR	false		
0x4220				
0x4229	VAR			
0x422A	VAR	true	Celsius	division by 10
0x422B	VAR	true	Celsius	division by 10
0x4235	VAR	true	Celsius	division by 10
0x4236	VAR	true	Celsius	division by 10
0x4237	VAR	true	Celsius	division by 10
0x4238	VAR	true	Celsius	division by 10
0x4239	VAR	true	Celsius	division by 10
0x423E	VAR			
0x4247	VAR	true	Celsius	division by 10
0x4248	VAR	true	Celsius	division by 10
0x424A	VAR	true	Celsius	division by 10
0x424B	VAR	true	Celsius	division by 10
0x424C	VAR	true	Celsius	division by 10
0x424D	VAR	true	Celsius	division by 10
0x424E	VAR	true	Celsius	division by 10
0x424F	VAR	true	Celsius	division by 10
0x4250	VAR	true	Celsius	division by 10
0x4251	VAR	true	Celsius	division by 10
0x4252	VAR	true	Celsius	division by 10
0x4253	VAR	true	Celsius	division by 10
0x4254	VAR	true	Celsius	division by 10
0x4255	VAR	true	Celsius	division by 10
0x4256	VAR	true	Celsius	division by 10
0x4257	VAR	true	Celsius	division by 10
0x4258	VAR	true	Celsius	division by 10
0x4259	VAR	true	Celsius	division by 10
0x425A	VAR	true	Celsius	division by 10
0x425B	VAR	true	Celsius	division by 10
0x425C	VAR	true	Celsius	division by 10
0x425D	VAR	true	Celsius	division by 10

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MsgNr	Type	Signed	Unit	Arithmetic
0x425F	VAR	true	Celsius	division by 10
0x4260	VAR	true	Celsius	division by 10
0x4261	VAR	true	Celsius	division by 10
0x4262	VAR	true	Celsius	division by 10
0x4263	VAR	false		
0x4264	VAR	false		
0x4265	VAR	false		
0x4266	VAR	false		
0x4267	VAR	true	Celsius	division by 10
0x4268	VAR	true	Celsius	division by 10
0x4269	VAR	false		
0x426A	VAR	true	Celsius	division by 10
0x426B	VAR	true		
0x426C	VAR	true		division by 0.1
0x426D	VAR	true	Celsius	division by 10
0x426E	VAR	true	Celsius	division by 10
0x426F	VAR	true	Celsius	division by 10
0x4270	VAR	true	Celsius	division by 10
0x4271	VAR	true	Celsius	division by 10
0x4272	VAR	true	Celsius	division by 10
0x4273	VAR	true	Celsius	division by 10
0x4274	VAR	true	Celsius	division by 10
0x4275	VAR	true	Celsius	division by 10
0x4276	VAR	true	Celsius	division by 10
0x4277	VAR	true	Celsius	division by 10
0x4278	VAR	true	Celsius	division by 10
0x4279	VAR	true	Celsius	division by 10
0x427A	VAR	true	Celsius	division by 10
0x427B	VAR	true	Celsius	division by 10
0x427C	VAR	true	Celsius	division by 10
0x427D	VAR	false		
0x427E	VAR	false		
0x427F	VAR	true	Celsius	division by 10
0x4284				
0x4286	VAR	false	Celsius	division by 10
0x4287	VAR	false	Celsius	division by 10
0x4288	VAR	false		
0x4289	VAR	false		division by 0.1
0x428A	VAR	false	Celsius	division by 10
0x428C	VAR	true	Celsius	division by 10
0x428D	VAR			
0x4290				
0x4291				
0x4292				
0x4293				
0x4294				
0x4295				
0x4296				
0x4297	VAR	true		
0x4298	VAR	true		
0x4299				
0x429A				
0x429B				
0x429C				
0x429F	VAR	false		
0x42A1	VAR	false		

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MsgNr	Type	Signed	Unit	Arithmetic
0x42A5	VAR	true	Celsius	division by 10
0x42A6	VAR	true	Celsius	division by 10
0x42A7	VAR	true	Celsius	division by 10
0x42A8	VAR	true	Celsius	division by 10
0x42A9	VAR	true	Celsius	division by 10
0x42AA	VAR	true	Celsius	division by 10
0x42AB	VAR	true	Celsius	division by 10
0x42AC	VAR	true	Celsius	division by 10
0x42AD	VAR	true	Celsius	division by 10
0x42AE	VAR	true	Celsius	division by 10
0x42AF	VAR	true	Celsius	division by 10
0x42B0	VAR	true	Celsius	division by 10
0x42B1	VAR	false		
0x42B2	VAR	false		
0x42B3	VAR	false		
0x42C2	VAR	true	Celsius	division by 10
0x42C3	VAR	true	Celsius	division by 10
0x42C4	VAR	true	kgfcm2	division by 100
0x42C5	VAR	true	kgfcm2	division by 100
0x42C9	VAR	true	Celsius	division by 10
0x42CA	VAR	false		
0x42CB	VAR	false		
0x42CC	VAR	false		
0x42CD	VAR	true	Celsius	division by 10
0x42CE	VAR	false		division by 60 (not documented in NASA.ptc)
0x42CF	VAR	false	Enthalpy	division by 10
0x42D0	VAR	false		
0x42D1	VAR	false		
0x42D2	VAR	false		
0x42D3	VAR	false		
0x42D4	VAR	true	Celsius	division by 10
0x42D6	VAR	true	Celsius	division by 10
0x42D7	VAR	true	Celsius	division by 10
0x42D8	VAR	true	Celsius	division by 10
0x42D9	VAR	true	Celsius	division by 10
0x42DB	VAR	false	Celsius	division by 10
0x42DC	VAR	false	Celsius	division by 10
0x42DD	VAR	false	Celsius	division by 10
0x42DE	VAR	false	Celsius	division by 10
0x42E8	VAR	false		division by 10
0x42E9	VAR	true		division by 10
0x42ED	VAR	true		
0x42EE	VAR	true		
0x42EF	VAR	true		
0x42F0	VAR	true	Celsius	division by 10
0x42F1	VAR			
0x4301	VAR			
0x4302	VAR	false	kW	division by 8.6
0x4401	LVAR			
0x4405				
0x4406				
0x4407				
0x440A	LVAR	false		LogicalAnd 0x00000002 + division by 2
0x440E	LVAR			
0x440F	LVAR			
0x4415	LVAR	false		

MsgNr	Type	Signed	Unit	Arithmetic
0x441B	LVAR	false		
0x441F	LVAR	false		
0x4420	LVAR	false		
0x4423	LVAR			
0x4424	LVAR			
0x4426	LVAR	false	kW	division by 1000
0x4427	LVAR	false	kW	division by 1000
0x4604	STR			
0x4608	STR			
0x4612	STR			
0x4619	STR			
0x461A	STR			
0x461C	STR			
0x461D	STR			
0x461E	STR			
0x8000	ENUM			
0x8001	ENUM			
0x8002	ENUM			
0x8003	ENUM			
0x8005	ENUM			
0x800D	ENUM			
0x8010	ENUM			
0x8011	ENUM			
0x8012	ENUM			
0x8013	ENUM			
0x8014	ENUM			
0x8015				
0x8016				
0x8017	ENUM			
0x8018	ENUM			
0x8019	ENUM			
0x801A	ENUM			
0x801F	ENUM			
0x8020	ENUM			
0x8021	ENUM			
0x8022	ENUM			
0x8023	ENUM			
0x8024				
0x8025	ENUM			
0x8026	ENUM			
0x8027	ENUM			
0x802A	ENUM			
0x8031	ENUM			
0x8032	ENUM			
0x8033	ENUM			
0x8034	ENUM			
0x8037	ENUM			
0x803B	ENUM			
0x803C	ENUM			
0x803F	ENUM			
0x8043	ENUM			
0x8045	ENUM			
0x8046	ENUM			
0x8047	ENUM			
0x8048	ENUM			
0x8049	ENUM			

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MsgNr	Type	Signed	Unit	Arithmetic
0x804B	ENUM			
0x804C	ENUM			
0x804D	ENUM			
0x804E	ENUM			
0x804F	ENUM			
0x8050	ENUM			
0x8051	ENUM			
0x8052	ENUM			
0x8053	ENUM			
0x8054	ENUM			
0x8055	ENUM			
0x8058	ENUM			
0x8059	ENUM			
0x805A	ENUM			
0x805B	ENUM			
0x805C	ENUM			
0x805D	ENUM			
0x805E	ENUM			
0x8061	ENUM			
0x8062				
0x8063	ENUM			
0x8065	ENUM			
0x8066	ENUM			
0x8077	ENUM			
0x8078	ENUM			
0x8079	ENUM			
0x807A	ENUM			
0x807B	ENUM			
0x807C	ENUM			
0x807D	ENUM			
0x807E	ENUM			
0x807F	ENUM			
0x8081	ENUM			
0x8083	ENUM			
0x808C	ENUM			
0x808D	ENUM			
0x808E	ENUM	false		LogicalAnd 0x0F
0x808F	ENUM			
0x8092	ENUM	false		
0x8099	ENUM	false		
0x809C	ENUM			
0x809D	ENUM			
0x809E	ENUM			
0x80A5	ENUM			
0x80A6	ENUM			
0x80A7	ENUM			
0x80A8	ENUM			
0x80A9	ENUM			
0x80AA	ENUM			
0x80AB	ENUM			
0x80AC				
0x80AE	ENUM			
0x80AF	ENUM			
0x80B1	ENUM			
0x80B2	ENUM			
0x80B4	ENUM			

MsgNr	Type	Signed	Unit	Arithmetic
0x80B8	ENUM			
0x80B9	ENUM			
0x80BC	ENUM			
0x80BE	ENUM			
0x80C1	ENUM			
0x80CE	ENUM			
0x80D7	ENUM			
0x80D8	ENUM			
0x8200	VAR			
0x8201	VAR			
0x8202	VAR	false		
0x8204	VAR	true	Celsius	division by 10
0x8206	VAR	true	kgfcm2	division by 10
0x8208	VAR	true	kgfcm2	division by 10
0x820A	VAR	true	Celsius	division by 10
0x820C	VAR	true	Celsius	division by 10
0x820E	VAR	true	Celsius	division by 10
0x8210				
0x8217	VAR	false		division by 10
0x8218	VAR	true	Celsius	division by 10
0x821A	VAR	true	Celsius	division by 10
0x821C	VAR	true	Celsius	division by 10
0x821E	VAR	true	Celsius	division by 10
0x8220	VAR	true	Celsius	division by 10
0x8222	VAR			
0x8223	VAR	true	Celsius	division by 10
0x8224	VAR	true	Celsius	division by 10
0x8225	VAR	true	Celsius	division by 10
0x8226	VAR	false		
0x8227	VAR			
0x8228				
0x8229	VAR	false		
0x822A	VAR	false		
0x822B	VAR	false		
0x822C	VAR	false		
0x822D	VAR	false		
0x822E	VAR	false		
0x822F				
0x8230	VAR			
0x8231	VAR			
0x8233	VAR			division by 8.6 (better 8.5 ?)
0x8234	VAR			
0x8235	VAR	false		
0x8236	VAR	false		
0x8237	VAR	false		
0x8238	VAR	false		
0x8239	VAR			
0x823B	VAR	false		
0x823C	VAR	false		
0x823D	VAR	false		
0x823E	VAR	false		
0x823F	VAR	false		appears when using S-NET pro 2 software
0x8240				
0x8241				
0x8243	VAR			
0x8244				

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MsgNr	Type	Signed	Unit	Arithmetic
0x8247	VAR			
0x8248	VAR			
0x8249	VAR			
0x824B	VAR			
0x824C	VAR			
0x824F	VAR	false		division by 10
0x8254	VAR	true	Celsius	division by 10
0x8255	VAR	true	Celsius	division by 10
0x825A	VAR	true	Celsius	division by 10
0x825B	VAR	true	Celsius	division by 10
0x825C	VAR	true	Celsius	division by 10
0x825D	VAR	true	Celsius	division by 10
0x825E	VAR	true	Celsius	division by 10
0x825F	VAR	true	Celsius	division by 10
0x8260	VAR	true	Celsius	division by 10
0x8261	VAR	true	Celsius	division by 10
0x8262	VAR	true	Celsius	division by 10
0x8263	VAR	true	Celsius	division by 10
0x8264	VAR	true	Celsius	division by 10
0x8265	VAR	true	Celsius	division by 10
0x8266	VAR	true	Celsius	division by 10
0x8267	VAR	true	Celsius	division by 10
0x8268	VAR	true	Celsius	division by 10
0x826B	VAR	true	Celsius	division by 10
0x826C	VAR	true	Celsius	division by 10
0x826D	VAR	false		
0x826E	VAR	false		
0x826F	VAR	false		
0x8270	VAR	false		
0x8271	VAR	false		
0x8272	VAR	false		
0x8273	VAR	false		
0x8274	VAR	false		
0x8275	VAR	false		
0x8276	VAR	false		
0x8277	VAR	false		
0x8278	VAR	false		
0x8279				
0x827A	VAR	true	Celsius	division by 10
0x827E				
0x827F				
0x8280	VAR	true	Celsius	division by 10
0x8281	VAR	true	Celsius	division by 10
0x8282				
0x8287	VAR	false	HP	
0x8298				
0x829A	VAR	true	Celsius	division by 10
0x829B				
0x829C				
0x829D				
0x829F	VAR	true	Celsius	division by 10
0x82A0	VAR	true	Celsius	division by 10
0x82A2	VAR			
0x82A3				
0x82A4				
0x82A6				

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MsgNr	Type	Signed	Unit	Arithmetic
0x82A8	VAR	true		division by 8.6 = kW
0x82A9	VAR	true		
0x82AF	VAR	false		
0x82B2	VAR			
0x82B3				
0x82B5	VAR			
0x82B6	VAR			
0x82B8	VAR	true	kgfcm2	division by 10
0x82B9				
0x82BA				
0x82BC	VAR	true		
0x82BD	VAR	true		
0x82BE	VAR	true	Celsius	division by 10
0x82BF	VAR	true	Celsius	division by 10
0x82C0				
0x82C1				
0x82C2				
0x82C3				
0x82C4				
0x82C8	VAR	true	Celsius	division by 10
0x82C9	VAR	true	Celsius	division by 10
0x82CA	VAR	false		
0x82CB	VAR	false		division by 10
0x82CC	VAR	false		division by 10
0x82CD	VAR	false		
0x82CE	VAR	false		division by 10
0x82CF	VAR	false		
0x82D0	VAR	false	RPM	division by 10
0x82D1	VAR			
0x82D2	VAR	false		
0x82D3				
0x82D4	VAR			
0x82D5				
0x82D6				
0x82D9	VAR			
0x82DA	VAR			
0x82DB	VAR	false		
0x82DC	VAR			
0x82DD	VAR			
0x82DE	VAR	true	Celsius	division by 10
0x82DF	VAR	true	Celsius	division by 10
0x82E0	VAR	true	Celsius	division by 10
0x82E1	VAR			
0x82E3	VAR	false	kW	division by 10.0
0x82E7	VAR	true	Celsius	division by 10.0
0x82E8	VAR	false		
0x82E9	VAR	true	Celsius	division by 10
0x82ED	VAR			
0x82F5	VAR	false		
0x82F6	VAR			
0x82F9	VAR	true	Celsius	division by 10
0x82FC	VAR	true		-32767 up to 32767
0x82FD	VAR			
0x8401	LVAR			
0x8404	LVAR			
0x8405	LVAR	false		

MsgNr	Type	Signed	Unit	Arithmetic
0x8408	LVAR			
0x8409	LVAR			
0x840B	LVAR	false		
0x840C	LVAR	false		
0x840E				
0x8411	LVAR			
0x8412				
0x8413	LVAR	false	kW	division by 1000
0x8414	LVAR	false	kW	division by 1000
0x8415	LVAR			
0x8416	LVAR			
0x8417	LVAR			
0x841A	LVAR			
0x841F	LVAR			
0x8601	STR			
0x8608	STR			
0x860A	STR			
0x860C	STR			
0x860D	STR			
0x860F	STR			
0x8613	STR			

Implementations

There are multiple open source implementations of the encoding and decoding of the NASA bitstream. Here is a list of such known implementations.

- C++: esphome_samsung_ac ([GitHub](https://github.com/lanwin/esphome_samsung_ac/tree/main) (https://github.com/lanwin/esphome_samsung_ac/tree/main))
- Swift: NASAKit ([GitHub](https://github.com/betaphi/NASAKit) (<https://github.com/betaphi/NASAKit>))

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