Intervention process on loop CHC

SandenVendo Septembre 2022

This document explains the process to follow when working on the CHC loop of a Sanden CDU-M or CDU-L unit

References:

Type	Model
CDU-L	R06A2A R06A2B R06A2C
CDU-M	R04A1A R04A1B R04A1C R04A1D

100% CO2 Condensing units

ECO-FRIENDLY REVOLUTION

Intervention process on loop CHC

List of possible interventions on the CHC circuit

- Compressor replacement
- Low pressure and High pressure sensor replacement
- Expansion valve replacement
- Gas Cooler replacement (cf. Lower Gas Cooler block replacement procedure)
- HPX (heat plate exchanger) (cf. Brazed Plate Heat Exchanger replacement procedure)

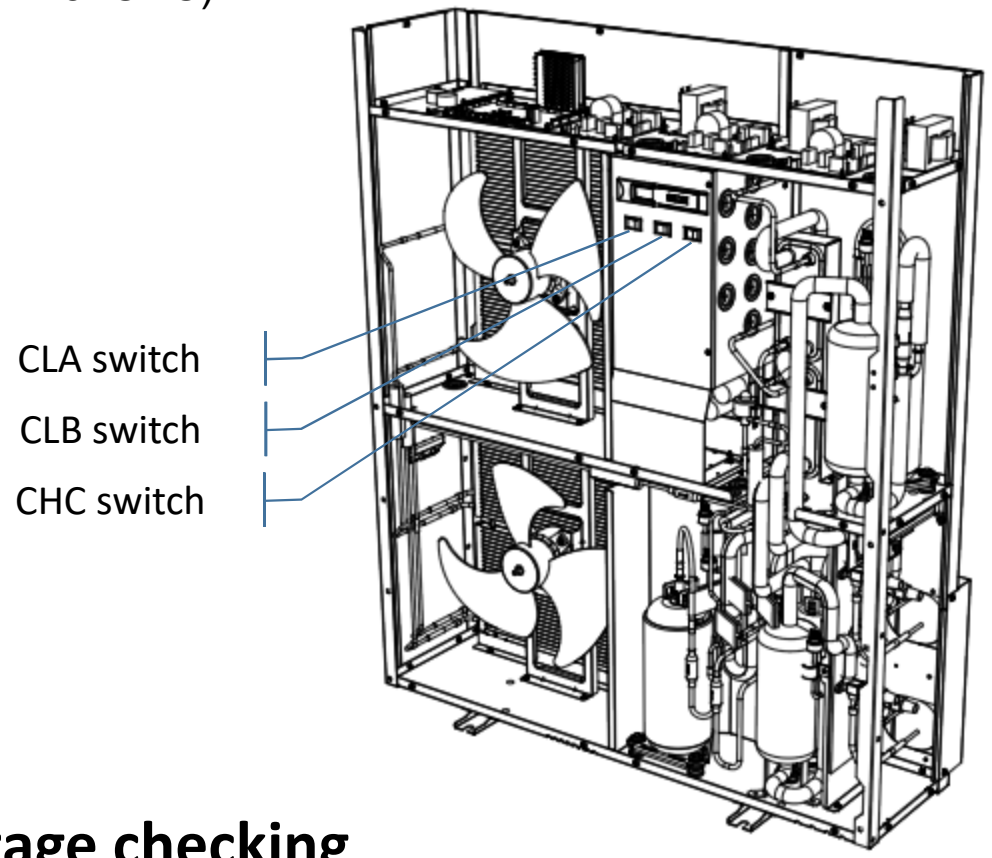
Intervention process

1. Shutdown of the compressor
2. Power supply shutdown & no voltage checking
3. CHC CO2 removal
4. Failed part of CHC loop replacement
5. Installation of trans critical charging valve
6. Pressure check with nitrogen
7. Vacuum
8. New CO2 load
9. Functional check

1. Shutdown of the compressor

Put the compressor switch in OFF position
Each switch is corresponding to one loop (CLA/CLB or CHC)

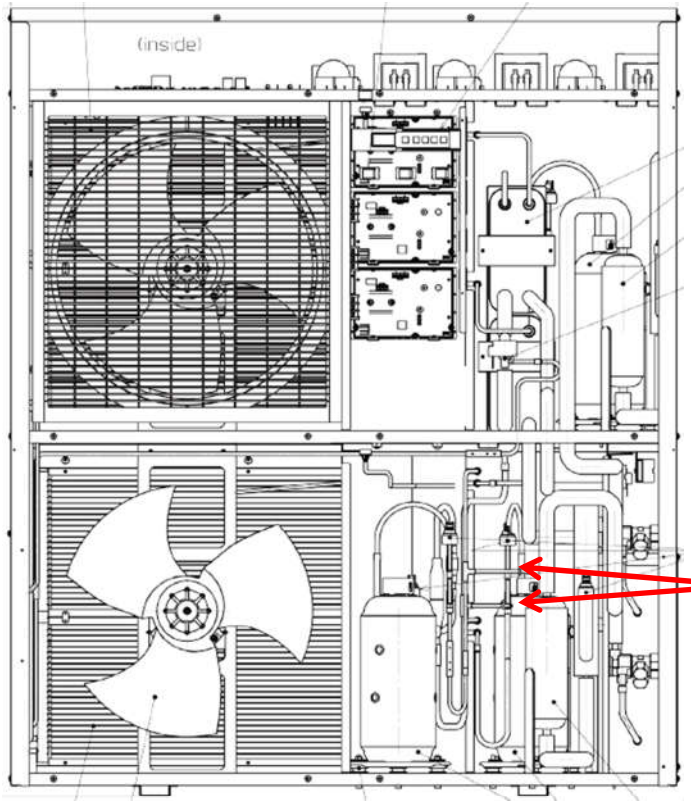
Remarks :
The CDU-M have no CLB loop .



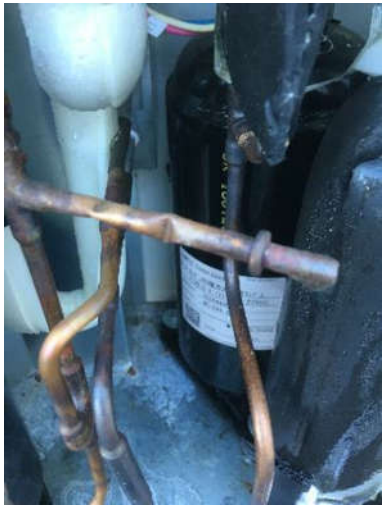
2. Power supply shutdown & no voltage checking

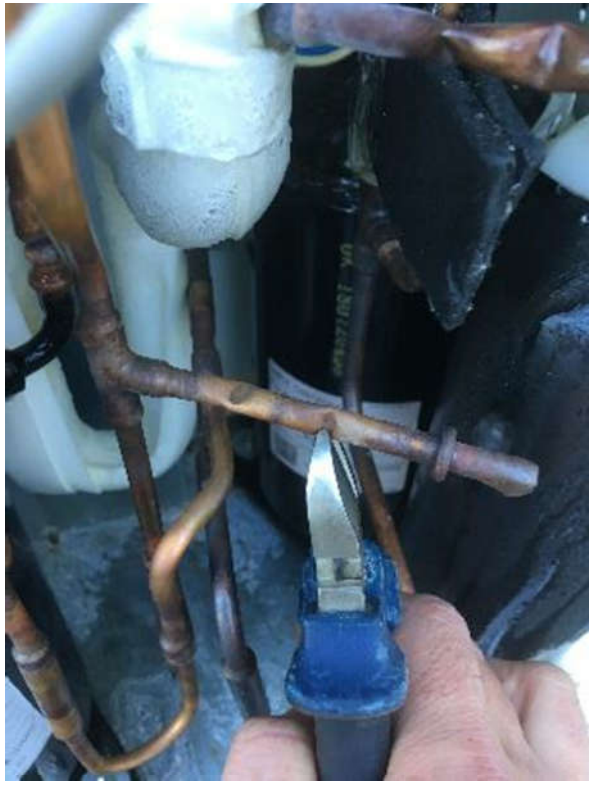
3. CHC CO2 removal

Once the compressor has been stopped and the power supply has been turned off.
Gently cut the charge tube (auxiliary piping) of loop C on the LP and or HP side using a cutting pliers, in order to release the R744 contained



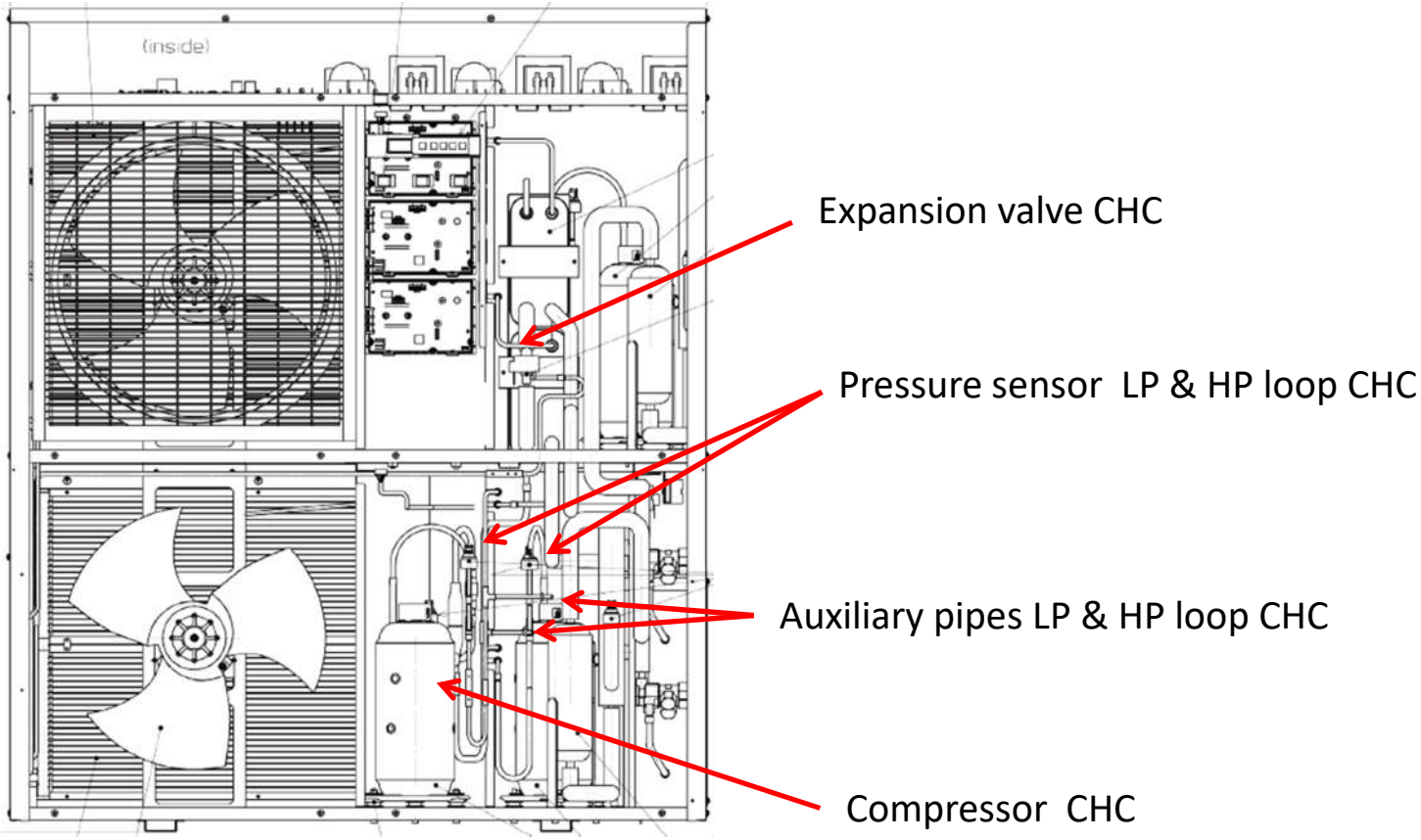
Auxiliary pipe LP & HP





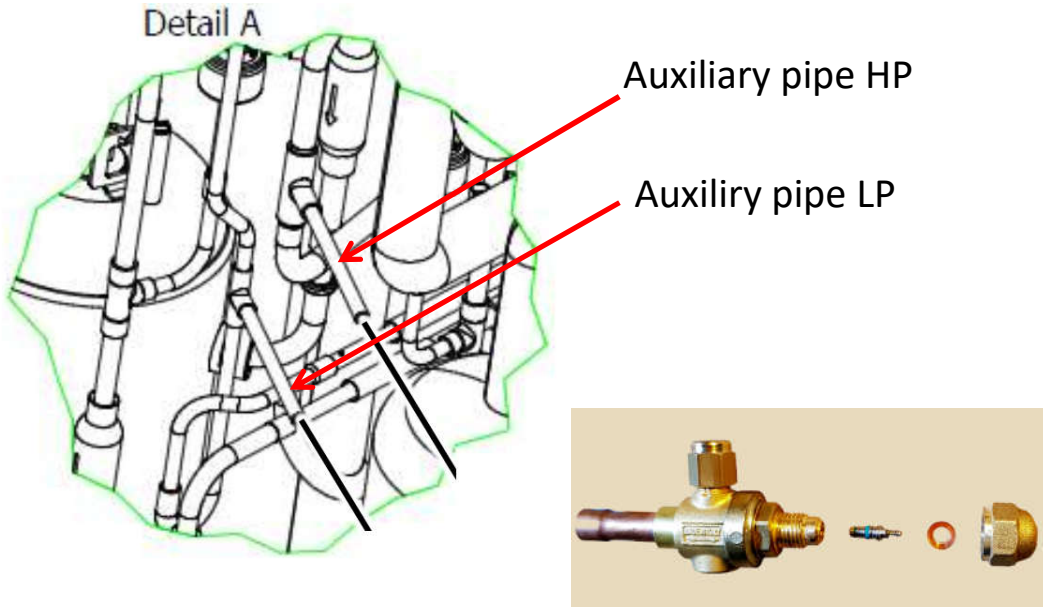
4. Failed part replacement

After checking that there is no pressure in the CHC loop, de-braze the defective part using a suitable torch.
Replace the defective part and re-solder it using an appropriate brazing rod (filler metal)



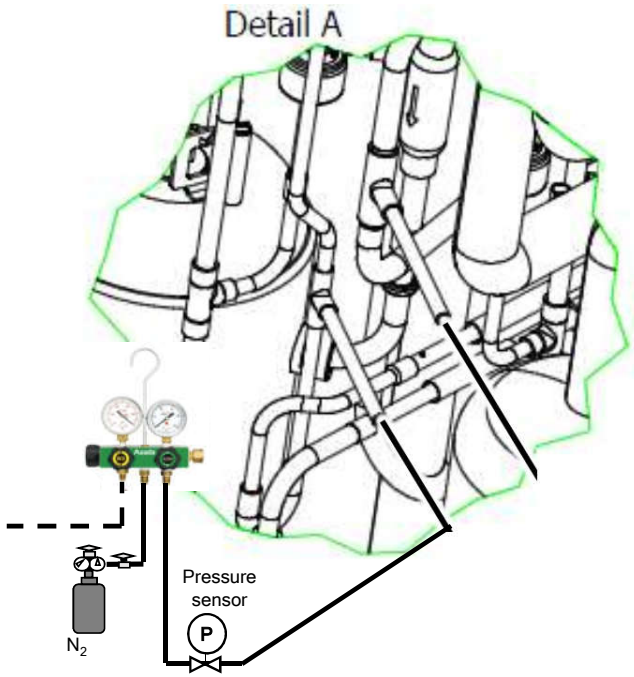
5. Trans critical charging valve

Debraze the auxiliary pipes of the loop CHC
Replace the auxiliary pipes by new pipes ¼ » (MWP 120 bar)
Installed one or 2 trans critical charging valve CO2



Example of trans critical charging valve CO2

6. Leakage test with nitrogen



Maintain nitrogen pressure during 24h ✓

1. Perform the leakage test operation by pressurizing the circuit with nitrogen.

2. Switch on the condensing unit and wait 20 sec for initialization (guarantee of the integrated expansion valve in the open position). Leave the CLA / CLB / CHC switches under the display in the OFF position, to avoid any start of the device

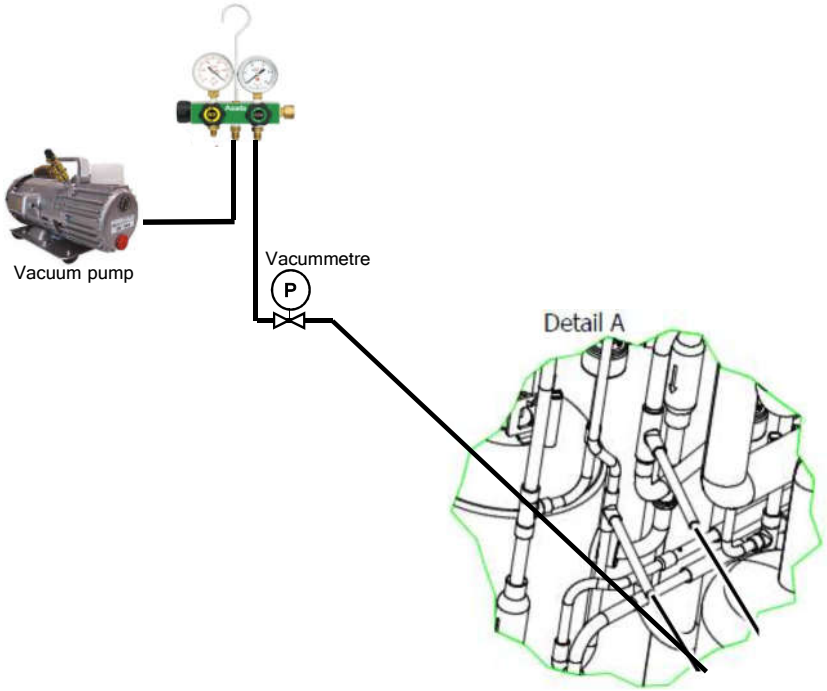
3. Charge with nitrogen through the suction trans critical valve.

4. Control nitrogen pressure with a manometer
   Maintain the test under pressure for 24 hours in order to detect pressure drops linked to micro-leaks.

5. Check brazes with a leakage detector or a bubble leak detection.

Note : when the CDU is turned on, reading the internal pressures of the CDU (Ps and Pd) in order to cross-reference the pressure information with the manometer used.

7. Vacuum



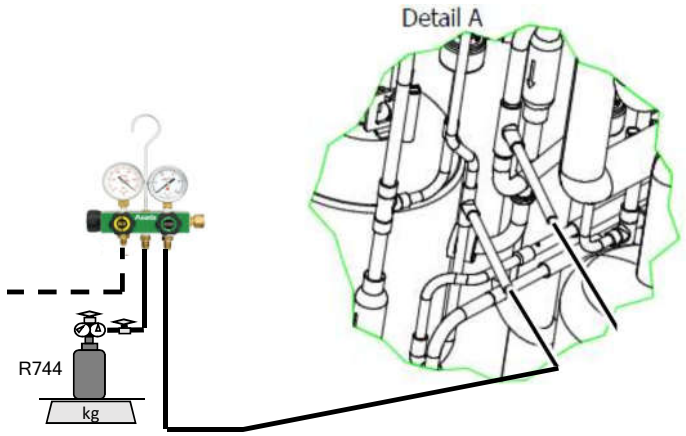
1. **Use CO2 compatible manifolds as well as dedicated transcritical CO2 hoses (R744)**
2. After the leak test, release the nitrogen contained in the circuit through the suction trans critical valve to prevent oil loss.
3. When the pressure reaches 1 bar, connect the manifold to the vacuum pump.
4. **Use a vacuum gauge for vacuum measurement and control**
5. Check the tightness of the connections
6. **Create a vacuum for 1 hour, maintain an internal pressure of -1 bar.**

Note: when the CDU is on, reading the internal pressures of the CDU (Ps and Pd) does not allow the vacuum to be measured, because the minimum pressure displayed is 0bars

8. New CO2 load

Depending of the CDU model and reference , full fill the right amount of CO2 by following the information's mentioned on table below.

Reference CDU-L	Reference CDU-M	Load R744 loop C
R06A2A R06A2B	R04A1A R04A1B	**380gr**
	R04A1C R04A1D	**400gr**
R06A2C		**420gr**



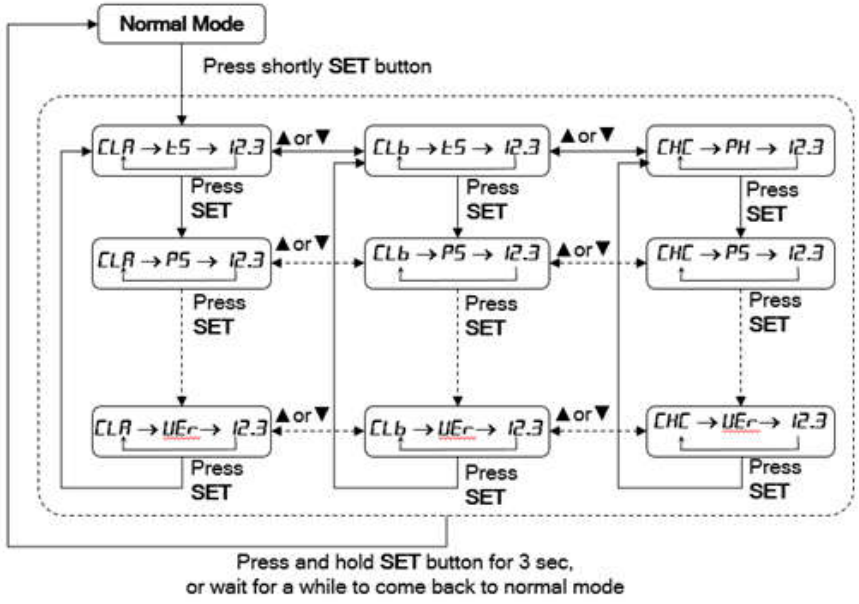
1. **Use R744 transcritical compatible manifolds as well as dedicated CO2 hoses (R744)**
2. **Plug the load connection on the suction side.** Position the CO2 bottle on the scale and carry out a tare
3. **Break the vacuum (vapor state). Then charge the R744 with the compressor off.**
4. If the pressures equalize and the load is not complete, start the CDU and the concerned loop (front switch under the display). The cooling demand is necessary to start the compressor.

9. Functional check

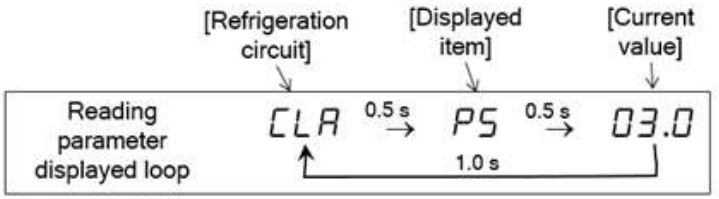
On the display select the reading parameters and control the different parameters of the loop C.

1- From Normal mode display,
Press shortly SET button.

2- Choose with ▲or ▼ button the Refrigerant Circuit [CLA, CLB or CHC]
3- Press shortly **SET** button to read the parameters of the following table. Scroll through Refrigerant Circuit with ▲or ▼ button.
4- Exit : Press and hold **SET** for 3 seconds to exit reading and come back to Normal mode (or press any key for 1 minute)



Reading parameters



N°	Cooling loop	Code	Content	Unit
1	A / B	t5	Suction Temperature sensor input	°C
	C	PH	Subcooler temperature calculation, difference between inlet and outlet (t1 -tu)	K
2	A / B / C	P5	Suction pressure (LP)	MPaG
3	A / B / C	Pd	Discharge pressure (HP)	MPaG
4	A / B / C	td	Discharge temperature sensor input	°C
5	A / B / C	t1	Subcooler inlet temperature sensor input	°C
6	A / B / C	tu	Subcooler outlet temperature sensor input	°C
7	A / B / C	tr	Electronic expansion valve position	Pulse
8	A / B / C	CI	Inverter compressor motor operating frequency	Hz
9	A / B / C	toL	Electronic enclosure temperature sensor input	°C
10	A / B / C	tAr	Ambient air temperature sensor input	°C
11	A / B / C	FF1	Gas cooler fan rotation speed (lower side)	rpm
12	A / B / C	FF2	Gas cooler fan rotation speed (upper side)	rpm
13	A / B / C	Fu1	Gas cooler fan control voltage (lower side)	V
14	A / B / C	Fu2	Gas cooler fan control voltage (upper side)	V
15	A / B / C	P5o	Target suction pressure	MPaG
16	A / B / C	Pdo	Target discharge pressure	MPaG
17	A / B / C	Co	Inverter compressor motor target frequency	Hz
18	A / B / C	SCu	Software release (since SCU 8B8 MRT5 V0.5)	-
19	A / B / C	UEr	Software release (since SCU 8B8 MRT5 V0.5)	-