

Commissioning Instruction
For Saloon HVAC System of
Amsterdam Metro

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Alstom Amsterdam Saloon HVAC Commissioning Instruction

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1 General

The purpose of this document is to test following system functions:

- Hardware -software connection
- Connection between microcomputer (FPC08/DIO8) and system components (car wiring)

1.1 Introduction

Safety instruction:

Operation, maintenance and repair work on the equipment are to be carried out **solely** by **competent qualified personal**.

Valid **standards and safety specifications** are to be observed!

Caution!!!

The service program may only be operated by skilled and instructed personnel as the system's safety devices are off in the SERVICE MODE and operating errors may damage components or the system as a whole.

Purpose of the functional check is the test of each single component and its right electrical connection to the power supply and to the controlling devices.

Basis of this check is a detailed instruction for each test-step (set into operation instruction).

All steps will be done by using a service-PC (laptop), which is connected to the FAIVELEY controller.

Main contents of the functional check are:

- Check of sensors
- Check of monitoring functions and digital inputs
- Check of digital outputs and contactors and functional control of each components
- Check of manual functions
- Check of safety devices

1.2 Procedure

Connect the control panel tested and the HVAC units correctly according to the corresponding electric schematics.

HVAC systems incorporate climate controllers (FPC08) and require component tests for proper startup using a laptop/PC on which a specific service program (monitor) for maintenance and commissioning has been installed. The program interacts with the computer via a USB interface.

Caution



Outputs can be activated without any logical safety protection when the HVAC system runs in service mode.

Please do the test according to the test sequence so as not to do harm to the HVAC system.

Generally:

- Set "OP Level"=0 to switch HVAC system in service mode to switch OFF all outputs at the same second, if there is a risk of danger arising. Or, power OFF the controller.

1.3 Preparations

Wiring between FPC08 and the control panel is in completed and has been tested. Dielectric test has been done. FPC08 must be disconnected during dielectric test. The refrigerant circuit has been charged with specified refrigerant. The procedure takes into account one FPC08 unit together with control panel.

1.4 Tools


Technical preconditions and tools are:

- Multi-meter (needed range of current:
 - Voltage 0.1V to 500V AC, 0.1V to 150V DC
 - Resistor 0,5 to 20kOhm (optional for fault finding)
- Clamp meter (optional, make current measurement more comfortable)
 - Current 0.1A to 50A AC, 0.1A to 20A DC

- PC (LAPTOP) (with ready installed maintenance software Mona (please compare Mona customer handbook) in minimal Configuration:
 - Pentium 200MHz or equal, 32MB RAM
 - Display 256 colors, 800x600
 - USB port (Ver1.1 or higher)
 - CD-ROM drive (for installation)
 - Windows 98 (second edition) or higher (NT 4.0,2000, XP)
 - Internet explorer 5.5 or higher
 - External mouse (optional)
- Maintenance software “MonA”
- USB Cable (both end are male plug) If more than 2M you need USB extension cable.



- FPC08 Operating Software Version 4.2
 - μ P Operating System (OS332)
Filename: _332_update.bat
 - DSP Operating System (OSdsp)
Filename: _tms_update.bat
- Application Software:

- AS version (Application software) direct download
Filename: down_appl.bat
- AS version (Application software) download with MonA:  Download
 - KS92C.s19 file (application software, check for last issue)
 - Appli.tst file (belonging to application software)
 - KS92Cxx.mpf file (project file of service software, check for last issue)
- Alternative to single software parts and for better overview about software and components of HVAC system is the Mona Maintenance CD, last issue



Remark: For easy download of all parts of software, use last issue of MonA Maintenance Software CD. All manuals, documents and information are stored at this place.

- Cooling spray (If possible)
For using please compare Mona customer handbook
(Mona Manual Issue E.pdf)
- Electrical interface document: KS97A-EID_ELECTRICAL_INTERFACE
- Electric schematic: KS97A000.000-00A.S4
- Software requirement specification: KS97-SRS
- Communication document: KS97A_CI_02
- USB-RS232 model driver software.

1.5 Preconditions for commissioning

step		Precondition	Required document	OK
1.	400V AC = OFF !!!	All components of the air conditioning system, including duct system must be completely mounted. Electrical connections and grounding must be installed.		<input type="checkbox"/>
2.		The dielectric check and insulation check of car wiring were tested successful	test report available and successful finished	<input type="checkbox"/>

3.		The electrical system supply must be available (110V DC, 3x400V AC, 250V AC)	Commissioning report available and successful finished	<input type="checkbox"/>
4.	400V AC = OFF !!!	The components of the air conditioning system must be accessible. This applies also to the accessibility of the HVAC unit on top of the car.		<input type="checkbox"/>
5.		Maintenance covers opened and also switch boxes opened (access to electrical devices and terminals)	The covers can be opened only when the HVAC unit is powered off.	<input type="checkbox"/>
6.		Ambient temperature of the car is at least 10°C. (If the ambient temperature is below 10 degrees, Require refrigeration professional guidance).		<input type="checkbox"/>

2 Visual check

For visual check, all supply voltage shall be switched OFF (3x400V AC, 110V DC, 250VAC).

2.1 Overview about components and devices

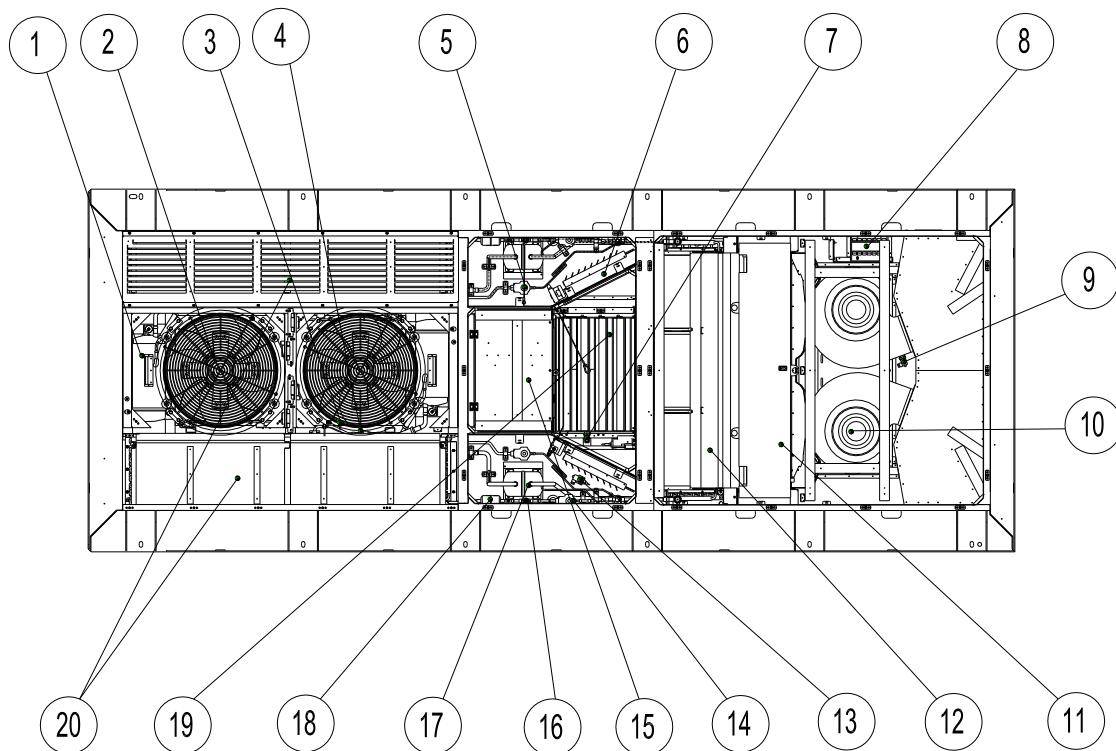


Figure 2-1: General overview of the unit

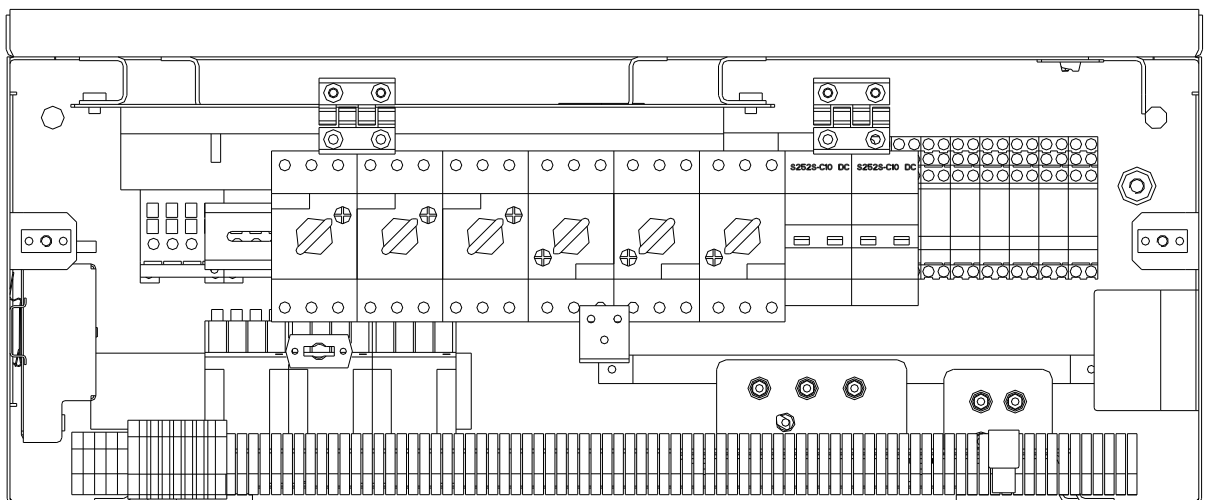
1 Compressor	11 Unit heater 1&2
2 Condenser Fan	12 Evaporator
3 High Pressure Switch	13 Fresh air temperature sensor
4 Low Pressure Switch	14 Thermal expansion valve
5 Liquid line solenoid valve	15 Control panel
6 Fresh air damper	16 Sight glass
7 Return air temperature sensor	17 Gas liquid separator
8 Transformer	18 Filter dryer
9 Supply air temperature sensor	19 Return air damper
10 Supply air fan	20 Condenser

2.2 Visual check of mechanical components *(If impossible to do then you can skip this step)*

Step	Location / device	Activity	OK
7.	HVAC unit	Unit well mounted, safety parts OK (no visible damages)	<input type="checkbox"/>
8.		Check drainage pipes	<input type="checkbox"/>
9.	Compressor	Corner shut-off valve open (use double open end wrench)	<input type="checkbox"/>
10.	Condenser fan	Free run possible, check arrow direction	<input type="checkbox"/>
11.	Supply fan	Free run possible, check arrow direction	<input type="checkbox"/>
12.	Generally	Check for fixation of all parts. Look for lost tools or forgotten material from production.	<input type="checkbox"/>
13.	Duct system	Tightness of the ducts, break-free pipes, isolation completely	<input type="checkbox"/>

400V AC = OFF !!!

2.3 Overview about the control panel



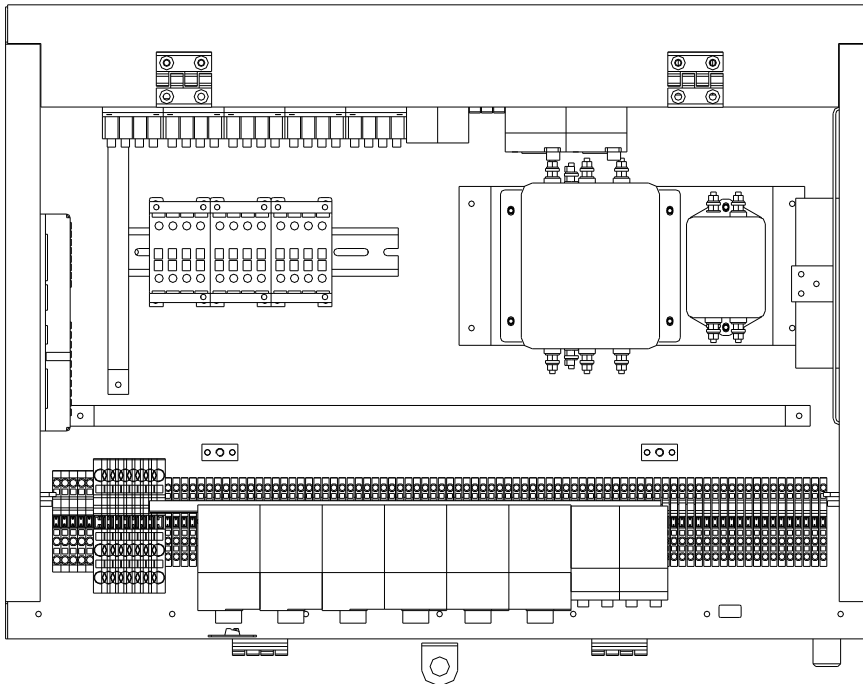


Figure 2-2: General overview of the control panel

2.4 Visual check of electrical components *(If impossible to do then skip this step)*

Step	Location / device	Activity	OK
14.	HVAC unit	Plugs of HVAC unit are connected	<input type="checkbox"/>
15.		Earth connection of HVAC unit	<input type="checkbox"/>
16.	Control panel interface in the car	Power supply from electrical system of car is available, terminals: T01: 1, 2, 3; T03: 1(+), T04:1(-)	<input type="checkbox"/>
17.		Earth connection of control panel HVAC unit are connected	<input type="checkbox"/>
18.	Controller FPC08 plugs and earth connection	Plug of controller FPC08 unit are connected (-P1,-P2, -P3, -P5,)	<input type="checkbox"/>
19.	Controller DIO8 plugs and earth connection	Plugs of controller DIO8 -X1,-X2, -X3, -X4, -X5, -X6, -X7 are connected	<input type="checkbox"/>

400V AC =OFF !!!

Step	Location / device	Activity	OK
20.		CAN-bus connection is ready, Controller unit	<input type="checkbox"/>
21.		Earth connection of controller is connected.	<input type="checkbox"/>
22.		Earth connection of control panel is connected.	<input type="checkbox"/>
23.	Return air temperature sensor	Return air sensor is connected	<input type="checkbox"/>
24.	Supply air temperature sensor	Supply air sensor is connected	<input type="checkbox"/>
25.	Fresh air temperature sensor	Fresh air sensor is connected	<input type="checkbox"/>
26.	Damper actuators are connected		<input type="checkbox"/>

3.1 Checking software versions and CAN-bus connection

Step		Activity	Response / PC-display	OK
31.	400V AC = OFF!!!	Requirements: Supply voltage for controller FPC08 (110V DC) is available	Switch ON QF07.	 v
32.		How to find actual software?	Please refer to Version Description Document (KS97A_VDD), last valid issue, To find at basket of software and quality documents	
33.		Check if MonA has already been installed on PC / Notebook	Please refer to “Mona customer handbook”, To find at basket of software and quality documents	<input type="checkbox"/>
34.		Check if interface cable between controller FPC08 (P4), USB and PC (COM1) is OK		<input type="checkbox"/>
35.		Check software status – start MonA.exe (version 2.3.0.0) - Insert password when starts MONA for the 1 st time - Choose language - Choose project file “KS97A03.mpf” - Push “√” (OK)	Version strings for FPC08 software are read out Application Software - SFRT Name: KS97A - Version: e.g. 0.3 (has to correspond to version enabled at the time) - Date: e.g. 11.06.11	<input type="checkbox"/>

36.	400V AC = OFF!!!	<p>Start “System Information”</p> <p>Password and key are found at basket of software and quality documents.</p> <p>compare Figure 3-1</p>	<p>μP332 Operating System</p> <ul style="list-style-type: none"> - <F> Number: 535996 - Version: e.g. 4.2 (has to be correspond to version enabled at the time) - Date: 01.02.05 <p>DSP Operating System</p> <ul style="list-style-type: none"> - <F> Number: 532230 - Version: e.g. 5.0 (has to be correspond to version enabled at the time) <p>Remark:</p> <p>OS 4.2 is included</p> <p>μP332 (4.2) and DSP (4.2)</p>	<p align="center"><input type="checkbox"/></p> <p align="center"><input type="checkbox"/></p> <p align="center"><input type="checkbox"/></p>
37.	400V AC = OFF !!!	<p>If application software loaded (version) does not correspond to status enabled or you read “Bad Symbols” in the left lower corner, leave „System Information” and update application software by calling up „Download”.</p>	<p>New application software has been downloaded into the controller.</p>	<p align="center"><input type="checkbox"/></p>
38.	400V AC = OFF !!!	<p>If download process is successful (status: active) go to chapter 3.2 Checking analog inputs,</p> <p>If not then continue with next line:</p>	<p>Successful connection</p>	<p align="center"><input type="checkbox"/></p>
39.		<p>How to find actual Operating System (OS) software?</p>	<p>Please refer to Version Description Document (KS97A_VDD), last valid issue, to find at basket of software quality documents</p>	<p align="center"><input type="checkbox"/></p>

40.		<p>If system software loaded (μP Operating System Version) does not correspond to status enabled, leave „MonA“.</p> <p>Update download of system software (μP Operating System Version) by calling up „_332_update.BAT“.</p>	<p>New system software (μP Operating System Version) is loaded into controller.</p> <p>Attention!</p> <p>When the download does not start, then do not stop the download and switch off and on the controller. After this the download should run.</p>	<input type="checkbox"/>
41.		<p>Update download of system software (SystemTMSVER) by calling up „_tms_update.BAT“.</p> <p>Important: Check for hardware issue of “FPC08 A,B,C” or “D FPC08”</p> <p>(Standard is defined D FPC08)</p>	<p>New system software (DSP Operating System Version) is loaded into controller.</p> <p>Attention!</p> <p>When the download does not start, then do not stop the download and switch off and on the controller. After this the download should run.</p> <p>Select right DSP software!</p>	<input type="checkbox"/>
42.	400V AC = OFF !!!	<p>Set the Real Time Clock from the controller (Base: PC / Laptop)</p> <ul style="list-style-type: none"> - Start “Real Time Clock Control” - Compare date and time of the controller with the real date and time <p>In case of a difference write the real date and time in the first line under “jj/mm/aa hh:mm:ss” or push the button situated right from the “PC system time”, if you sure that this date and time is correct.</p> <p>compare Figure 3-2</p>	<p>Controller time for FPC08 are read out</p> <ul style="list-style-type: none"> - under “jj/mm/aa hh:mm:ss” you read the actual controller real time clock <p>after few seconds later you read the new actual controller real time clock under “jj/mm/aa hh:mm:ss”</p>	<input type="checkbox"/>
43.		<p>Check ‘DIO8 connected’ in MONA overview screen ‘</p>	<p>The light is green when the CAN connection is ok</p>	<input type="checkbox"/>

Overview of system and application softwares

Application Software		Hardware	
HFG Name :	ks97a	Type :	FPC08
Version :	0.30	S\N :	1458
Date :	2011-6-11	P\N :	536898
		Reset Counter :	2106
µP Operating System			
<F> Number :	535996	Configuration	
Version :	4.20	Id number :	1
Date :	2005-2-1	Version :	1.00
Checksum :	33E7	Date/time :	2010-5-10 0:12:00
DSP Operating System		Test Mode & Service Mode	
<F> Number :	532230	Status :	Running
Version :	4.21		






Figure 3-1 Overview of system and application software

Analogue Inputs

AI_01_FAS	16.07 °C
AI_02_RAS	191.16 °C
AI_03_SAS	189.50 °C
AI_04_PWRDec	188.24 °C
AI_05	68.18 °C
AI_06	-1.69 °C

Digital Inputs

DI_01_VENT	<input checked="" type="checkbox"/>	DI_31_SAFH	<input checked="" type="checkbox"/>
DI_02_HP1	<input checked="" type="checkbox"/>	DI_32_SAFL	<input checked="" type="checkbox"/>
DI_03_HP2	<input checked="" type="checkbox"/>	DI_33_LP1	<input checked="" type="checkbox"/>
DI_04_ESAF	<input checked="" type="checkbox"/>	DI_34_LP2	<input checked="" type="checkbox"/>
DI_05_CPR1	<input checked="" type="checkbox"/>	DI_35_FAD	<input checked="" type="checkbox"/>
DI_06_CPR2	<input checked="" type="checkbox"/>	DI_36_CDF	<input checked="" type="checkbox"/>
DI_07_UH1	<input checked="" type="checkbox"/>	DI_37_RAD	<input checked="" type="checkbox"/>
DI_08_UH2	<input checked="" type="checkbox"/>	DI_38_UHOV	<input checked="" type="checkbox"/>


Digital Outputs

DQ_01_CPR1	<input type="checkbox"/>	DQ_31_RADC	<input type="checkbox"/>
DQ_02_CPR2	<input type="checkbox"/>	DQ_32_FADC	<input type="checkbox"/>
DQ_03_CDF1	<input type="checkbox"/>	DQ_33_Y3	<input type="checkbox"/>
DQ_04_CDF2	<input type="checkbox"/>	DQ_34_Y4	<input type="checkbox"/>
DQ_05_SAFH	<input type="checkbox"/>	DQ_35_ESAF	<input type="checkbox"/>
DQ_06_SAFL	<input type="checkbox"/>	DQ_36_UH1	<input type="checkbox"/>
DQ_07_FADO	<input type="checkbox"/>	DQ_37_UH2	<input type="checkbox"/>
DQ_08_FPCOK	<input checked="" type="checkbox"/>	DQ_38_RADIO	<input type="checkbox"/>

OP Level 9 OP Level 9 => RUN MODE
OP Level 0 => SERVICE MODE

DIO/8 connection OK ■
Note: Please check the connection between FPC08 and DIO8

Amsterdam metro saloon
HVAC System



Force Damper Control Active

Force FAD Target

Force RAD Target

1: Fully close;2-4, mid position;5, fully open

LEGEND

contact open

contact closed

ATTENTION

All work with the service programm shall only be carried out by trained personnel.

When the system is running in SM Level 0= "0", the safety features integrated in the software can be disabled.

Any faulty operation can cause destruction of the HVAC system.

Forcing A_Input: Doubleclick the value Forcing D_Input: Doubleclick the lamp Forcing D_Output: Set SM_Level "0" and Doubleclick the lamp

Figure 3-2 IBS view

3.2 Checking analog inputs

step		Activity	Response / PC-display	OK
44.	400V AC = OFF !!!	Check of analogue inputs: Start Mona software and open Mona – IBS view (compare Figure 3-2 IBS view)	Compare display value with expected value (see table below) The result can be different, but the tendency shall be clear	
45.		AI_01_FAS (Fresh air T° sensor) - Check temperature	The result shall be real ambient temperature value. For example 20°C	<input type="checkbox"/>
46.		AI_02_RAS (Return air T° sensor) - Check temperature	The result shall be real inside temperature value. For example 20°C	<input type="checkbox"/>
47.		AI_03_SAS (Supply air T° sensor) - Check temperature	The result shall be real duct temperature value. For example 20°C	<input type="checkbox"/>
48.		AI_04_PWRNOR (Main power detector) - The power 400V OK - The power 250V OK - The power failure	AI_04 short circuit >100°C 4°C <AI_04<12°C AI_04 open circuit <-20°C	<input type="checkbox"/> <input type="checkbox"/>
49.		AI_05 (Reserved) -	Reserved	<input type="checkbox"/>
50.		AI_06_ (Reserved)	Reserved	<input type="checkbox"/>

3.3 Checking logical outputs

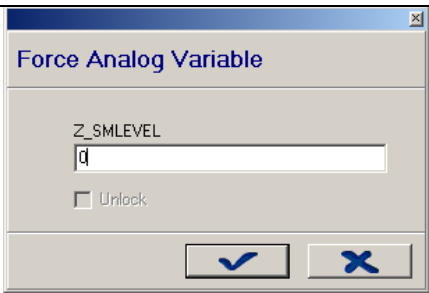
Step	Activity	Response / PC-display	OK
51.	Check DQ_08_FPCOK on Mona	DQ_08_FPCOK = 1L	<input type="checkbox"/>

Step	Activity	Response / PC-display	OK
52.	400V AC = OFF!!! Check of relay outputs: (ATTENTION! all logical safety functions are inactive during service mode!). Set “OP Level” = 0 first. Force AI_04 is 120		<input type="checkbox"/>
		Send the simulate 400V OK signal to FPC and control circuit	<input type="checkbox"/>
53.	Force DQ_01_CPR 1= 1L (Compressor1 KM11 control) Check DI_05_CPR1 Check DI_02_HP1	Contactor KM11 is ON. DI_05_CPR = 1L DI_02_HP1 = 1L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	Force DQ_01_CPR 1= 0L Check DI_05_CPR1 Check DI_02_HP1	Contactor KM11 is OFF. DI_05_CPR = 0L DI_02_HP1 = 0L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
54.	Force DQ_02_CPR 2= 1L (Compressor1 KM12 control) Check DI_06_CPR2 Check DI_03_HP2	Contactor KM12 is ON. DI_06_CPR2 = 1L DI_03_HP2 = 1L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
	Force DQ_02_CPR 2= 0L Check DI_06_CPR2 Check DI_03_HP2	Contactor KM12 is OFF. DI_06_CPR2 = 0L DI_03_HP2 = 0L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
55.	400V AC = OFF!!! Force DQ_03_CDF1 = 1L (Condenser fan KM13 control) Check DI_36_CDF	Contactor KM13 is ON. DI_36_CDF = 0L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_04_CDF2 = 1L (Condenser fan KM14 control) Check DI_36_CDF	Contactor KM14 is ON. DI_36_CDF = 1L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_03_CDF1 = 0L (Condenser fan KM13 control) Check DI_36_CDF	Contactor KM13 is OFF. DI_36_CDF = 0L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_04_CDF2 = 0L (Condenser fan KM14 control) Check DI_36_CDF	Contactor KM14 is OFF. DI_36_CDF = 0L	<input type="checkbox"/> <input type="checkbox"/>

Step	Activity	Response / PC-display	OK
56.	Force DQ_05_SAF = 1L (Supply fan high speed KM15 control) Check DI_31_SAFH	Contactor KM15 is ON. DI_31_SAFH = 1L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_05_SAFH = 0L Check DI_31_SAFH	Contactor KM15 is OFF. DI_31_SAFH = 0L	<input type="checkbox"/> <input type="checkbox"/>
57.	Force DQ_06_SAFH = OFF!!! Force DQ_06_SAFL = 1L (Supply fan low speed KM16 control) Check DI_32_SAFH	Contactor KM16 is ON. DI_32_SAFH = 1L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_06_SAFL = 0L Check DI_32_SAFL	Contactor KM16 is OFF. DI_32_SAFL = 0L	<input type="checkbox"/> <input type="checkbox"/>
58.	Force DQ_36_UH1 = 1L (Unit heater contactor KM18 control) Check DI_07_UH1	Contactor KM18 is ON. DI_07_UH1 = 1L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_36_UH1 = 0L Check DI_07_UH1	Contactor KM18 is OFF. DI_07_UH1 = 0L	<input type="checkbox"/> <input type="checkbox"/>
59.	Force DQ_37_UH2 = 1L (Unit heater contactor KM19 control) Check DI_08_UH2	Contactor KM19 is ON. DI_08_UH2 = 1L	<input type="checkbox"/> <input type="checkbox"/>
	Force DQ_37_UH2 = 0L Check DI_08_UH2	Contactor KM19 is OFF. DI_08_UH2 = 0L	<input type="checkbox"/> <input type="checkbox"/>
60.	Force DQ_07_FADO = 1L (Open fresh air damper1&2)	40sec later, FAD should be in full open position.	<input type="checkbox"/>
	Check DI_35_FAD (Close position=1L)	DI_35_FAD = 0L	<input type="checkbox"/>
	Force DQ_07_FADO = 0L		<input type="checkbox"/>

Step	Activity	Response / PC-display	OK
65.	Force DQ_34_Y4 = 1L (Open solenoid valve)	Small special sound from the solenoid valve of the unit.	<input type="checkbox"/>
	Force DQ_34_Y4 = 0L	Small special sound from the solenoid valve of the unit.	<input type="checkbox"/>
66.	Force DQ_35_ESAF = 1L (Emergency fan contactor KM17 control) Check DI_04_ESAF	Contactor KM17 is ON. DI_04_ESAF = 1L	<input type="checkbox"/>
	Force DQ_35_ESAF = 0L Check DI_04_ESAF	Contactor KM17 is OFF. DI_04_ESAF = 0L	<input type="checkbox"/>
67.	QF07 is off		<input type="checkbox"/>
	Unlock the AI_04		<input type="checkbox"/>

3.4 Checking logical inputs

Step	Activity	Response / PC-display	OK
68.	Check of digital inputs: Open IBS view and set "OP level"=0 at first. Check for status of each inputs, follow the described activity and check again		<input type="checkbox"/>
69.	Switch off AC power line.	400V AC = OFF!!!	<input type="checkbox"/>
70.	DI_33_LP1 (Low pressure switch LP1 feedback) - If the pressure is OK	Check DI_33 with MONA OK = 1L	<input type="checkbox"/>
71.	DI_34_LP2 (Low pressure switch LP2 feedback) If the pressure is OK	Check DI_34 with MONA OK = 1L	<input type="checkbox"/>
72.	DI_38_UHOV (Unit heater over temperature feedback) - Check DI_38	Check DI_38 with MONA OK = 1L	<input type="checkbox"/>

400V AC = OFF!!!

3.5 Checking system functions

step	Activity	Response / PC-display	OK
73.	All the sensors are connected. All connectors are connected. Be sure that T _{fresh} > 10°C		<input type="checkbox"/>
74.	Reset FPC by OFF/ON QF07. Set "OP Level" = 9	System is in auto mode.	<input type="checkbox"/> <input type="checkbox"/>
75.	Switch on QF01~06; Switch on QF08;	400V AC voltage applied to the units. 400V=ON!!!	<input type="checkbox"/>
76.	Go to "Maintenance"-Test mode list in the main menu - Open complete list - Select „Test Mode List“	A new windows opened and all Test mode Command: FALSE OR 0L Status: Ended	<input type="checkbox"/>
77.	Set the system in "test mode" - Select "Release testmode" and click the red arrow button	Read: Release testmode Command: true or 1L Status: running	<input type="checkbox"/> <input type="checkbox"/>
78.	Start supply fan low speed testing - Set "TM_SAFL" to TRUE - Check the rotation of supply fan - Measure the current	Read: TM_SAFL Command: true or 1L Status: running, KM16 ON The rotation direction is acc. to the arrow on the motor SAF1 L+ SAF2L= ____A, ____A, ____A (Desired value 0.6~1.0A)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
79.	Stop testing SAF low speed - Set "TM_SAFL" to False	KM16 is OFF.	<input type="checkbox"/>

400V AC = ON!!!

step	Activity	Response / PC-display	OK
83.	Start compressor1 testing - Set "TM_CPR1" to TRUE - Check AI_03_SAS DI_02_HP1, DI_33_LP1 - Measure the current - Set "TM_CPR1" to False	Read: TM_CPR1 Command: true or 1L Status: running, KM11 ON	<input type="checkbox"/>
		AI_03_SAS goes down. DI_02, DI_33 are ON. Total= ____A, ____A, ____A (Desired value 12~19.1A)	<input type="checkbox"/>
84.	Start compressor2 testing - Set "TM_CPR2" to TRUE - Check AI_03_SAS DI_03_HP2, DI_34_LP2 - Measure the current - Set "TM_CPR2" to False	Read: TM_CPR2 Command: true or 1L Status: running, KM12 ON	<input type="checkbox"/>
		AI_03_SAS goes down. DI_03, DI_34 are ON. Total= ____A, ____A, ____A (Desired value 12~19.1A)	<input type="checkbox"/>

400V AC = ON!!!

89.	<p>Stop emergency ventilation test</p> <ul style="list-style-type: none"> - Set "TM_ESAF" to False 	KM17 is OFF.	<input type="checkbox"/>
90.	<p>Go to System Overview in the main menu</p> <ul style="list-style-type: none"> - open complete list Select "Event Memory" 	A new window is opened.	<input type="checkbox"/>
91.	<p>Erase of Event Memory</p> <ul style="list-style-type: none"> - Double click on the button "ERASE EVENT MEMORY" 	When MONA starts again, repeat erasing once	<input type="checkbox"/>
92.	<p>Erase of Component Memory</p> <ul style="list-style-type: none"> - Double click on the button "COMPONENT MEMORY" 		<input type="checkbox"/>
93.	<p><u>Reset of controller:</u></p> <p>switch OFF 110V DC (QF07) for 5 sec. after 5 sec. 110V DC is switched ON again</p>	Controller makes a reset and starts again	<input type="checkbox"/>
94.	<p>Click "Exit" button to leave MONA</p>	MONA screen is closed.	<input type="checkbox"/>

4 ABBREVIATIONS AND DEFINITIONS

110V DC	Control voltage – (master controller and emergency inverter)
400V AC	Power supply aircon (power device)
AI...	Analog input with number
AS	Application software
CDF	Condenser fan
CPR	Compressor
DI...	Digital input with number
DQ...	Digital output with number
FPC08	FAIVELEY PLC
FT	FAIVELEY Transportation
HVAC	Heating, Ventilation and Air Conditioning
I / O	Input / Output
MONA	HFG Service Software
MVB	Multifunction Vehicle Bus
NSDB	Node Supervisor Database
OS	Operating software
SAF	Supply air fan
SFRT	Shanghai Faiveley Railway Technology Co. Ltd.
SW	Software
PTU	Portable Test Unit, Lap-Top
RS232	Serial interface
T _e	Ambient temperature
T _i	Return air temperature
Tic	Set point value
UH	Unit heater
WE	End of the car