MITSUBISHI HEAVY INDUSTRIES

AIR CONDITIONING & WATER HEATING

SERVICE SUPPORT **HANDBOOK**

Available from

WARNING

The information contained in this ‘Service Support Handbook’ is intended for use by qualified service technicians familiar with safety procedures and equipped with the proper tools and test instruments.

This ‘Service Support Handbook’ is meant for guidance only, as it does not cover all installation circumstances, and therefore will not form part of any legally binding contract. Additionally, the information presented here is not a replacement for, nor a substitute to, the Manufacturers Technical Manuals or the installation instructions provided with the air conditioning equipment.

MHI Air Conditioners contain pressurized refrigerants that are harmful to the atmosphere so all refrigeration works must be performed by a qualified "F-Gas" registered person.

Please do not remove any covers, or attempt any repair or measurement on any MHI air conditioning product, unless you are suitably qualified and licensed to do so.

Repairs made by unqualified persons can result in hazards to you and others.

Technical Assistance is available Monday to Friday
between the hours of 08:00 and 17:00
tel: **03301 235 598**

Email: mhitechnicalsupport@beijerref-technical.com

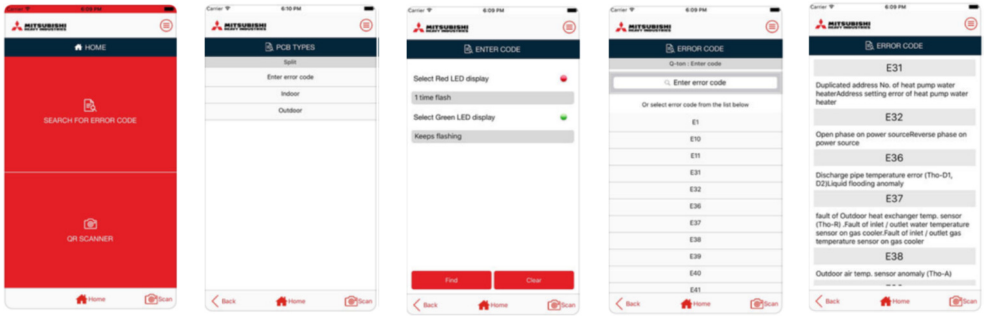
MHI e-service app

MHI e-service
DCSL Software Ltd
Free

Compatibility

IPhone or IPad on IOS9.3 or later
Android devices on 4.3 or later.

Screenshots



Description

MHI e-service is an application that enables users to make a quick search of the meaning of error codes that may appear when there is a malfunction in "Mitsubishi Heavy Industries Thermal Systems, Ltd" Air conditioning system, and the probable cause of the malfunction.

In addition this application enables you to scan unit's QR code and search the meaning of error codes depending on the model type.

The application covers "Mitsubishi Heavy Industries Thermal Systems, Ltd" Air conditioning systems: Split (RAC & PAC), VRF, Q-ton & A2W.

The MHI e-service app also incorporates a Refrigerant charge calculator for MHI's current ranges of RAC & PAC splits, (single and multi-split systems), and VRF systems.

The MHI e-service app is a free download available from Google Play for Android devices (4.03 or later), or the Apple App Store for IOS devices (IOS9.3 or later).

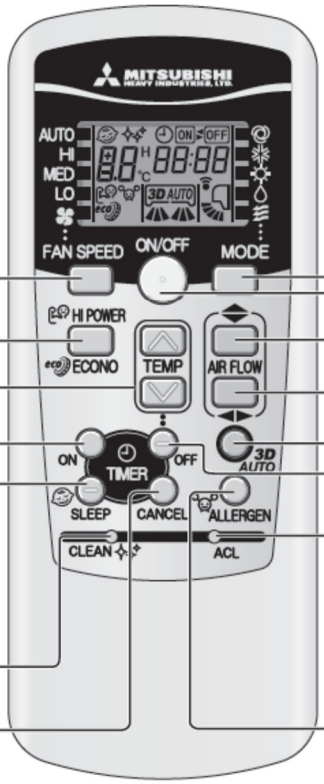
Remote Controls - Hi-Wall Mounted Split & Multi Split Systems Before Proceeding to RAC Self Diagnosis Information, ensure the correct Remote Control handset is being used.		
Indoor Model	**Remote Control**	**Replacement**
SRK--HC-S, HC-S1, HD-S, ZD-S, ZDX-S, SKM--ZD-S	RKT502A420	RMA502A001 / RMA502A001C
SRK--HD-S1, HE-S1, ZD-S1, SKM--ZF-S	RMA502A001C	RMA502A001F
SRK--HG-S	RKX502A001B	RKX502A007B
SRK--ZE-S, ZE-S1,	RKW502A200	RKW502A200D
SRK--ZFX-S, ZGX-S	RKW502A200B	-
SKM--ZG-S	RKX502A001G	-
SRK--ZG-S, ZHX-S, ZIX-S SRK--ZJ-S, ZJ-S1, ZJX-S, ZJX-S1	RKX502A001C	RKX502A007C
SRK--ZK-S	RKX502A200	RKW502A200D
SRK--ZM-S, ZMX-S, ZR-S	RLA502A700B	RLA502A701B
SRK--ZMP-S	RKX502A001P	RKX502A007P
SRK--ZR-W	RLA502A700R	RLA502A701R
SRK--ZS-S, ZS-SB, ZS-ST, SRK--ZS-W, ZS-WB, ZS-WT	RLA502A701L	-
SRK--ZSP-S, ZSP-W, SKM--ZSP-S, ZSP-W	RKX502A008P	RKX502A007P
SRK--ZSX-S, ZSX-SB, ZSX-ST, SRK--ZSX-W, ZSX-WB, ZSX-WT	RLA502A700K	-

Remote Controls - Floor Console Split & Multi Split Systems Before Proceeding to RAC Self Diagnosis Information, ensure the correct Remote Control handset is being used.		
Indoor Model	**Remote Control**	**Replacement**
SRF--ZIX-S, ZJX-S, ZJX-S1	RKX502A001K	-
SRF--ZMX-S	RLA502A700C	RLA502A701C / RLA502A701S

Remote Controls - Ducted Multi Split Systems Before Proceeding to RAC Self Diagnosis Information, ensure the correct Remote Control handset is being used.		
Indoor Model	**Remote Control**	**Replacement**
SRRM--ZE-S	RMA502A001	RMA502A001C / RMA502A001F
SRRM--ZF-S	RMA502A001C	RMA502A001F
SRR--ZJ-S	RKX502A001B	RKX502A007B
SRR--ZM-S	RLA502A701C	RLA502A701S
SRR--ZM-W	RLA502A701S	-
SRR--ZS-W	RLA502A701AF	-

Remote Controls - Cassette Multi Split Units Before Proceeding to RAC Self Diagnosis Information, ensure the correct Remote Control handset is being used.		
Indoor Model	**Remote Control**	**Replacement**
STM--ZE-S	RMA502A001	RMA502A001C / RMA502A001F
STM--ZF-S	RMA502A001C	RMA502A001F

RKX502A001C



FAN SPEED button

Each time the button is pushed, the ■ indicator is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

This button sets the room temperature.
(This button changes the present time and TIMER time.)

ON TIMER button

This button selects ON TIMER operation.

SLEEP button

This button selects to SLEEP operation.

CLEAN switch

This switch changes the CLEAN mode.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.

OPERATION MODE select button

Each time the button pushed, the ■ indicator is switched over in turn.

ON/OFF (luminous) button

Press for starting operation, press again for stopping.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) mode.

AIR FLOW (LEFT/RIGHT) button

This button changes the air flow (left/right) mode.

3D AUTO button

This button sets 3D AUTO operation.

OFF TIMER button

This button selects OFF TIMER operation.

RESET switch

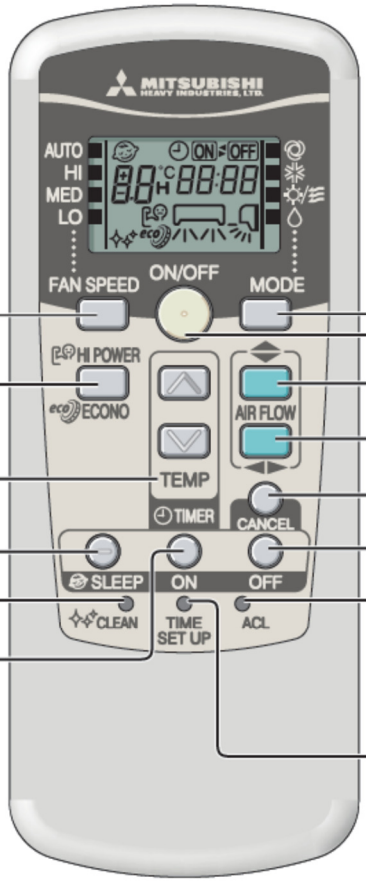
Switch for resetting microcomputer and setting time.

ALLERGEN CLEAR button

This button selects ALLERGEN CLEAR operation.

- The above illustration shows all controls, but in practice only the relevant parts are shown.

RKW502A200



FAN SPEED button

Each time the button is pushed, the ■ indicator is switched over in turn.

HI POWER/ECONO button

This button changes the HIGH POWER/ ECONOMY mode.

TEMPERATURE button

This button sets the room temperature.
(This button changes the present time and TIMER time.)

SLEEP button

This button selects SLEEP operation.

CLEAN switch

This switch changes the CLEAN mode.

ON TIMER button

This button selects ON TIMER operation.

OPERATION MODE select button

Each time the button is pushed, the ■ indicator is switched over in turn.

ON/OFF (luminous) button

Press for starting operation, press again for stopping.

AIR FLOW (UP/DOWN) button

This button changes the air flow (up/down) mode.

AIR FLOW (LEFT/RIGHT) button

This button changes the air flow (left/right) mode.

CANCEL button

This button cancels the ON timer, OFF timer, and SLEEP operation.

OFF TIMER button

This button selects OFF TIMER operation.

RESET switch

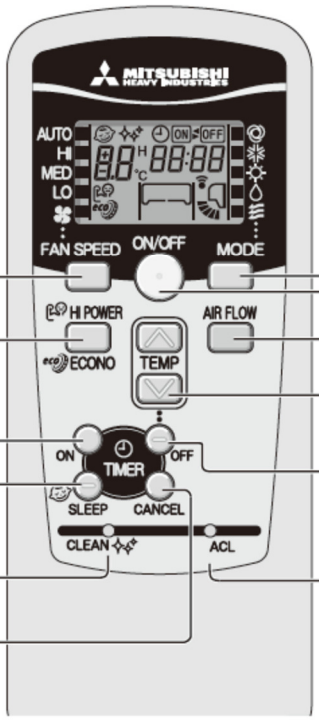
Switch for resetting microcomputer.

TIME SET UP switch

This switch for setting the time.

- The above illustration shows all controls, but in practice only the relevant parts are shown.

RKX502A008P



FAN SPEED button
Each time the button is pressed, the fan speed changes.

HI POWER/ECONO button
This button changes the HIGH POWER/ ECONOMY mode.

ON TIMER button
This button selects ON TIMER operation.

SLEEP button
This button selects SLEEP operation.

CLEAN switch
This switch selects the SELF CLEAN mode.

CANCEL button
This button cancels the ON timer, OFF timer, and SLEEP operation.

OPERATION MODE select button
Each time the button is pressed, the mode changes.

ON/OFF (luminous) button
Press to start operation, press again to stop.

AIR FLOW (UP/DOWN) button
This button changes the air flow (up/down) direction.

TEMPERATURE button
These buttons set the room temperature. (These buttons are used for setting the current time and timer function as well.)

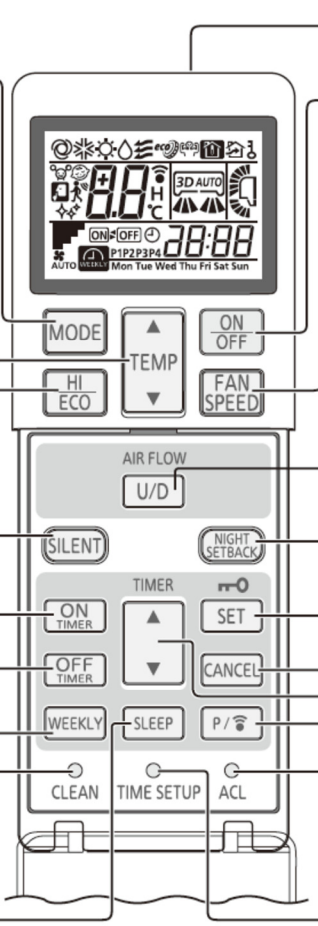
OFF TIMER button
This button selects OFF TIMER operation.

ACL switch
This switch resets the program to default state.

- The above illustration shows all controls, but in practice only the relevant parts are shown.

RLA502A701S

Operation section



OPERATION MODE select button
Each time the button is pressed, the mode changes.

TEMPERATURE button
This button sets the room temperature.

HI/ECO button
This button changes the HIGH POWER/ ECONOMY operation.

SILENT button
This button changes the SILENT operation.

ON TIMER button
This button selects ON TIMER operation.

OFF TIMER button
This button selects OFF TIMER operation.

WEEKLY button
This button switches the WEEKLY TIMER to ON/OFF.

CLEAN switch
This switch selects the CLEAN operation.

SLEEP button
This button selects SLEEP operation.

•The above illustration shows all controls, but in practice only the relevant parts are shown.

Transmission section

ON/OFF (luminous) button
Press to start operation, press again to stop.

FAN SPEED button
Each time the button is pressed, the fan speed changes.

AIR FLOW (UP/DOWN) button
This button changes the air flow (up/down) direction.

NIGHT SETBACK button
This button sets NIGHT SETBACK operation.

SET/Child Lock button
Use this button to set the timer and Child Lock.

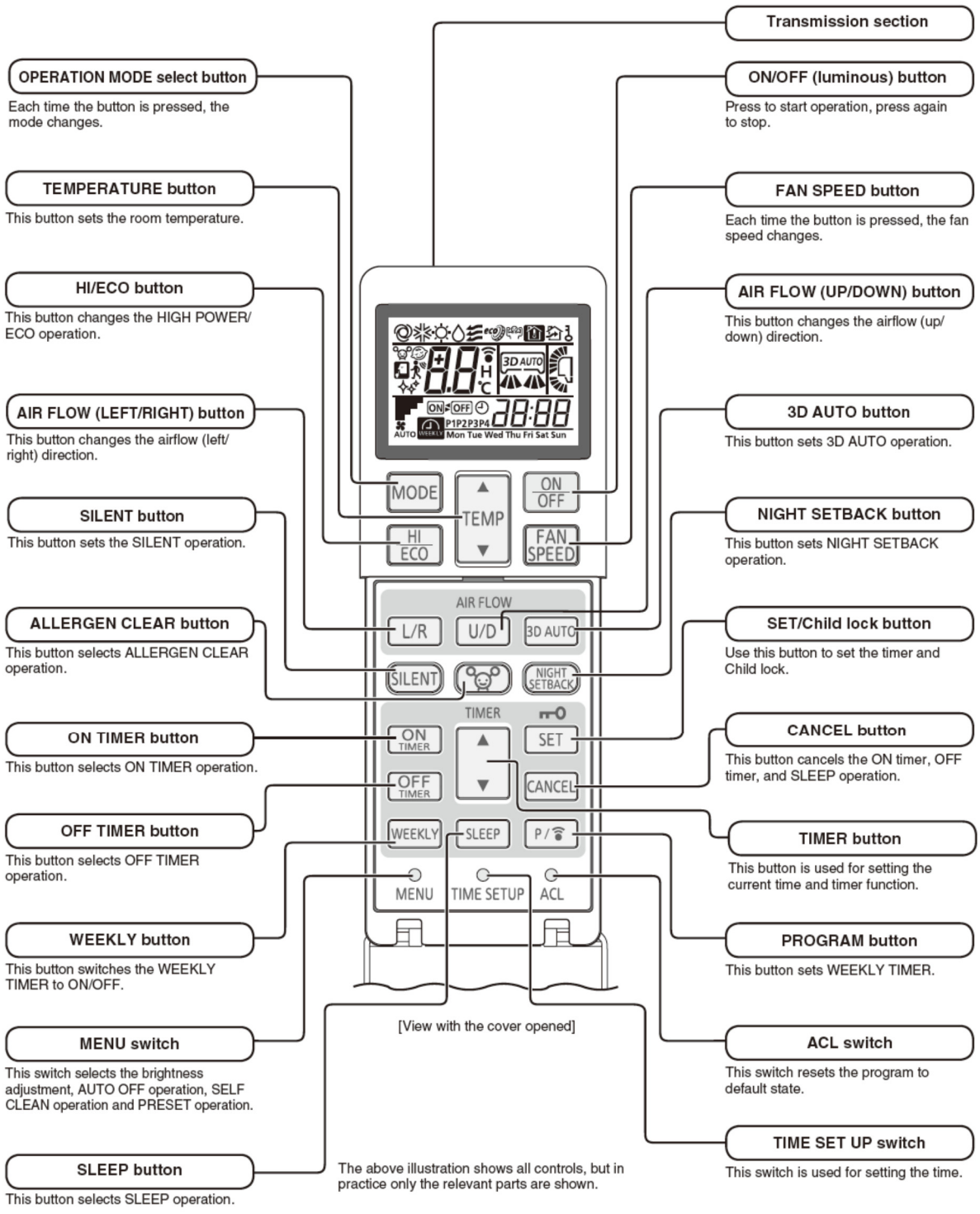
CANCEL button
This button cancels the ON timer, OFF timer, and SLEEP operation.

TIMER button
This buttions is used for setting the current time and timer function.

PROGRAM button
This button sets WEEKLY TIMER.

ACL switch
Switch for resetting microcomputer.

TIME SET UP switch
This switch is for setting the time.



<Indication during ECO operation>

On SRK—ZSX-S, ZSX-S1 and ZSX-W the GREEN operation LED becomes BLUE when “ECO” mode is selected.

RC-E5 Layout

The figure below shows the remote control with the cover opened. Note that the items in the liquid crystal display (LCD) area are shown for explanation purpose.

Pull the cover downwards to open.

Ventilation display
Displayed during ventilation operation

Central control display
Displayed when the air conditioning system is controlled by centralized remote control.

Timer operation display
Displays the timer operation setting.

Temperature setting buttons
These buttons are used to set the temperature of the room.

Timer button
This button is used to set the timer mode.

Timer setting buttons
These buttons are used to set the timer mode and the time.

GRILL button
This button has no function.
When this button is pressed, INVALID OPER (Invalid Operation) is displayed,but it does not mean a failure.

AIR CON No. button
- Display the indoor unit number connected to this remote control.
- This button is used for indoor unit address setting.

CHECK button
This button is used at servicing.

TEST button
This button is used during test operation.

Weekly timer display
Displays the settings of the weekly timer.

Operation setting display area
Displays setting temperature, airflow volume, operation mode and operation message.

Operation/check indicator light
During operation: Lit in green
In case of error: Flashing in red

Operation/stop button
This button is used to operate and stop the air conditioning system.
Press the button once to operate the system and press it once again to stop the system.

MODE button
This button is used to change the operation mode.

FAN SPEED button
This button is used to set the airflow volume.

VENT button
This button is used to operate external ventilator.

LOUVER button
This button is used to operate/stop the swing louver.

SET button
- This button is used to fix the setting.
- This button is used to set the silent mode.

RESET button
- Press this button while making settings to go back to the previous operation.
- This button is also used to reset the "FILTER CLEANING" display. (Press it after cleaning the air filter)

Red light flashing and Blank display

This remote control can be connected to upto 16 indoor units. If only ONE indoor unit is connected the fault code will be shown directly otherwise when one of the connected units goes into fault the remote cannot show the fault code so it will flash the red LED whilst clearing the screen.
To identify the fault and which units faulty press the "AIR CON NO." button on the remote and use the "/\" and "\/" buttons above the "CHECK" button to view the individual units status.

Filter Clean Indication

The 'Filter Clean' indication is timer based and is shown after a preset number of hours of indoor unit fan operation has occurred. It is recommended that the filters are checked and, if necessary, cleaned before the indication is reset.
To reset the 'Filter Clean' indication timer press the "RESET" button a few times or once for each attached indoor unit.

The system must not be run without filters fitted and the filters MUST be regularly cleaned otherwise the airflow through the unit will be reduced AND the coil can become blocked impairing the systems performance and efficiency.

Days of Week displayed in brackets and units not operating to time clock settings.

HOLIDAY MODE will automatically set if power to the system is disrupted (i.e. power-cut or the systems isolator is turned off).
When HOLIDAY MODE is set the remote control ignores the time clock function and will do until the HOLIDAY MODE is cancelled. The HOLIDAY Mode is set and cancelled in the timer/weekly timer/ menu.
Press "TIMER" then "SET"
Use the "/\" and "\/" buttons above the "CHECK" button and go to 'Weekly Timer' then press "SET"
Use the "/\" and "\/" buttons above the "CHECK" button and go to 'Holiday Set' then press "SET"
Select each day of the week and press "SET" to set or cancel the days setting.

RC-E5 OPERATION DATA

To access the RC-E5 Remote Controls Operation Data function, press the "CHECK" button on the MASTER remote control.

On 'Operation data' press the "SET" button.

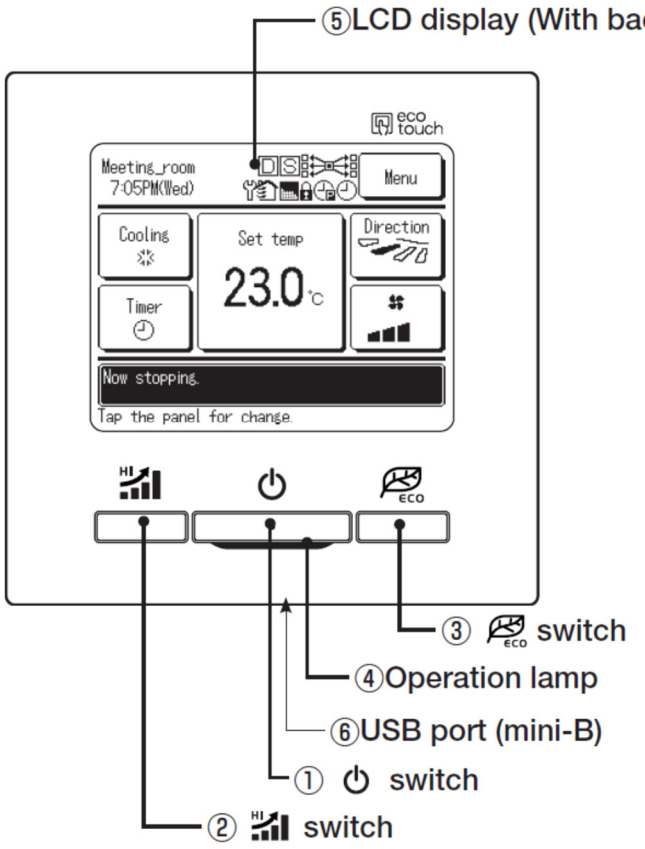
If 'I/U No' is displayed select the unit number required, using the "/\" and "\/" buttons above the "CHECK" button, then press the "SET" button

All navigation is carried out using the "/\" and "\/" buttons above the "CHECK" button.

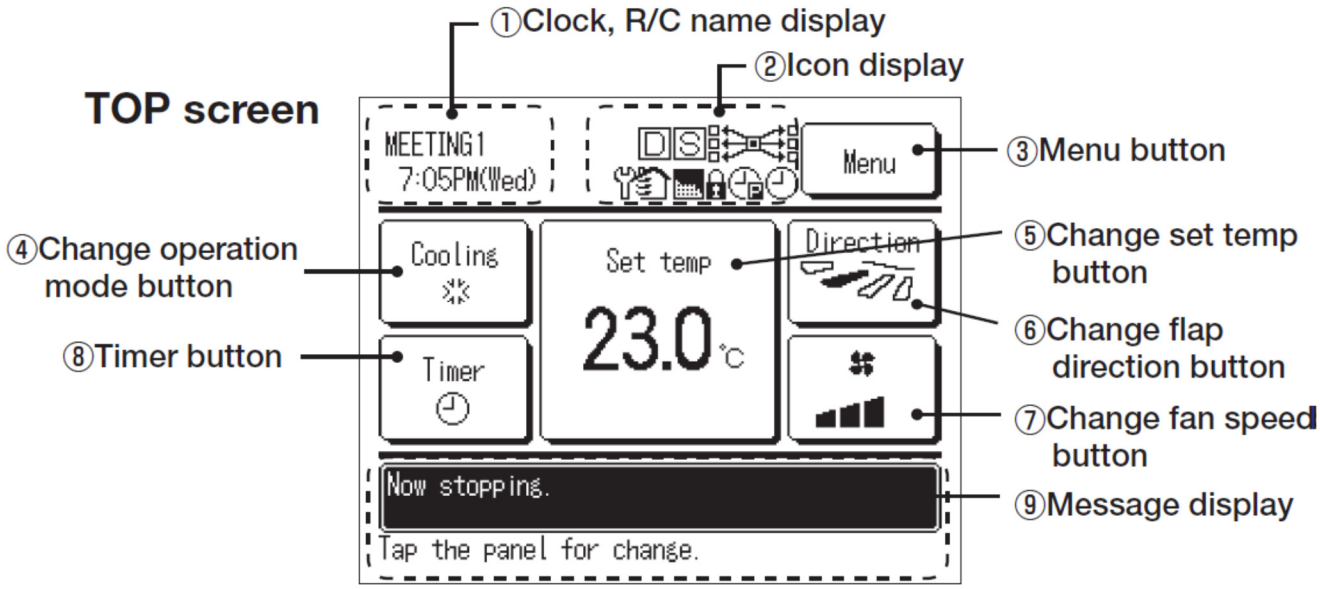
				RAC Unit Compatibility
01	MODE		Current operation mode	ok
02	SET TEMP	℃	Set temperature	ok
03	RETURN AIR	℃	Return air sensor temperature	ok
04	SENSOR	℃	Remote control sensor temperature	ok
05	THI-R1	℃	Indoor heat exchanger sensor (on U bend)	ok
06	THI-R2	℃	Indoor heat exchanger sensor (on Capillary)	ok
07	THI-R3	℃	Indoor heat exchanger sensor (on suction header)	-
08	I/U FANSPEED		Indoor unit fan speed	-
09	DEMAND	Hz	Required frequency	-
10	ANSWER	Hz	Response frequency	-
11	I/U EEV	PULSE	Pulse rate of KX indoor unit expansion valve	-
12	TOTAL I/U RUN	Hr	Total running hours of the indoor unit	-
21	OUTDOOR	℃	Outdoor air temperature	ok
22	THO-R1	℃	Outdoor unit heat exchanger sensor	ok
23	THO-R2	℃	Outdoor unit heat exchanger sensor	-
24	COMP	Hz	Compressor frequency	ok
25	HP	MPa	High pressure (x10=Bar)	-
26	LP	Mpa	Low pressure (x10=Bar)	-
27	Td	℃	Discharge Pipe Temperature	ok
28	COMP BOTTOM	℃	Compressor base temperature	-
29	CT	Amp	Current	ok
30	TARGET SH	℃	Target Super Heat	-
31	SH	℃	Super Heat temperature	-
32	TDSH	℃	Compressor discharge pipe super heat	ok
33	PROTECTION No		Protection state number of the compressor	-
34	O/U FANSPEED		Outdoor unit fan speed	ok
35	63H1		63H1 High pressure switch on/off	-
36	DEFROST		Defrost control on/off	ok
37	TOTAL COMP RUN	Hr	Total running hours of compressor	-
38	O/U EEV1	PULSE	Pulse rate of the outdoor unit expansion valve EEVC	ok
39	O/U EEV2	PULSE	Pulse rate of the outdoor unit expansion valve EEVH	-

Details of 33 Compressor Protection Status	
No.	Contents of display
0	Normal
1	Discharge pipe temperature protection control
2	Discharge pipe temperature anomaly
3	Current safe control of inverter primary current
4	High pressure protection control
5	High pressure anomaly
6	Low pressure protection control
7	Low pressure anomaly
8	Anti-frost prevention control
9	Current cut
10	Power transistor protection control
11	Power transistor anomaly (Overheat)
12	Compression ratio control
13	-
14	Condensation prevention control
15	Current safe control of inverter secondary current
16	Stop by compressor rotor lock
17	Stop by compressor startup failure

RC-EX1 & EX1A Layout



Touch panel control, which is operated by tapping the LCD screen with a finger, is employed for all functions except for 1 On/Off switch, 2 Hi Power switch and 3 ECO switch.



When the demand control is effective.

When setting is made from the sub R/C.

During the ventilation operation

When "filter sign" is up.

When the central control (Optional) is running.

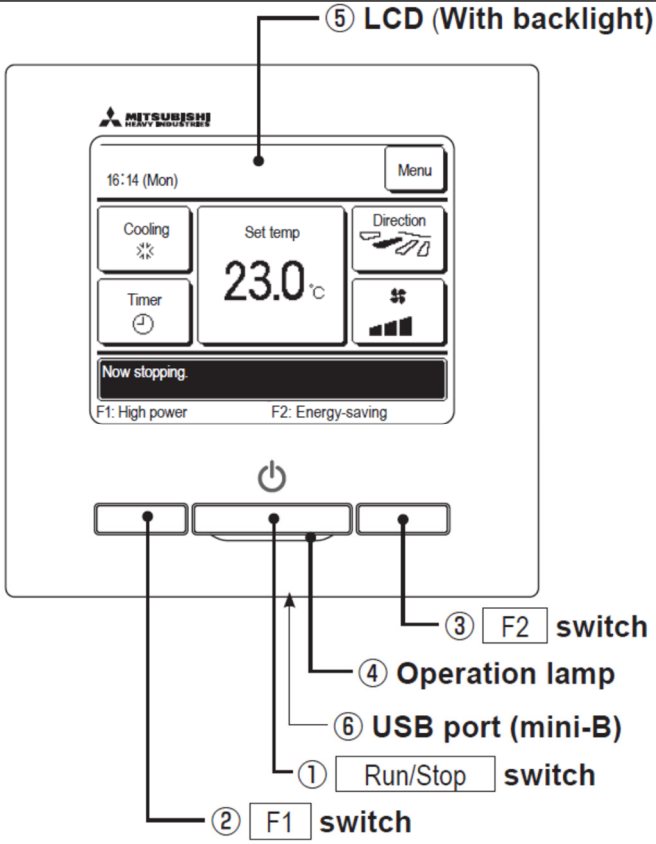
When the periodical inspection is necessary.

When the Permission/ Prohibition setting is made.

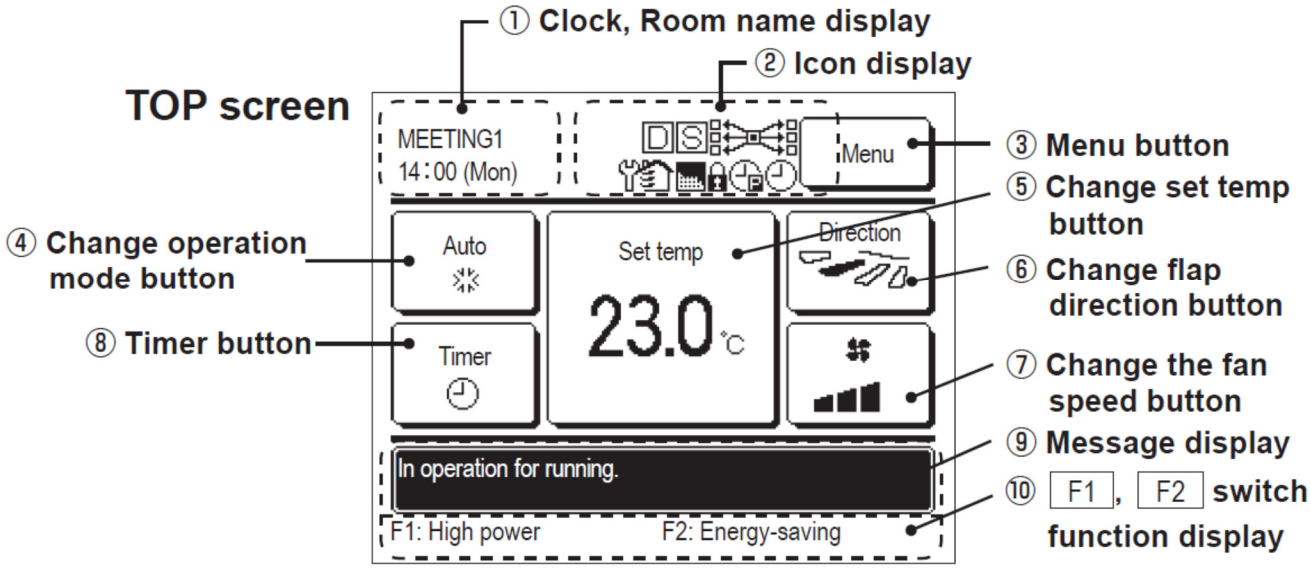
When weekly timer is set.

When peak-cut timer is set.

RC-EX3 Layout



Touch panel control, which is operated by tapping the LCD screen with a finger, is employed for all functions except 1: On/Off switch, 2: F1 Programmable F1 switch and 3: Programmable F2 switch.



When the demand control is effective.

When setting is made from the sub R/C.

During the ventilation operation

When "filter sign" is up.

When the central control (Optional) is running.

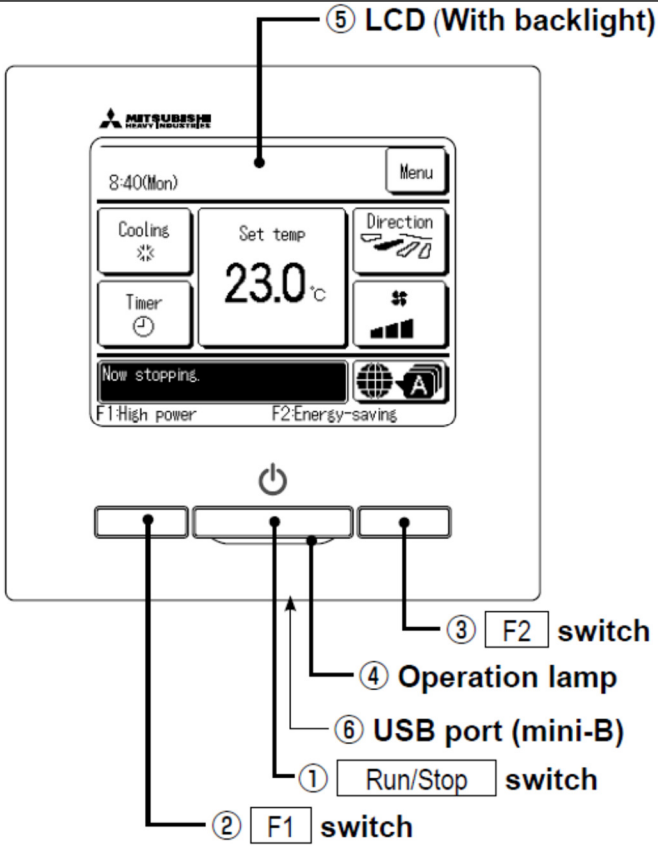
When the periodical inspection is necessary.

When the Permission/ Prohibition setting is made.

When weekly timer is set.

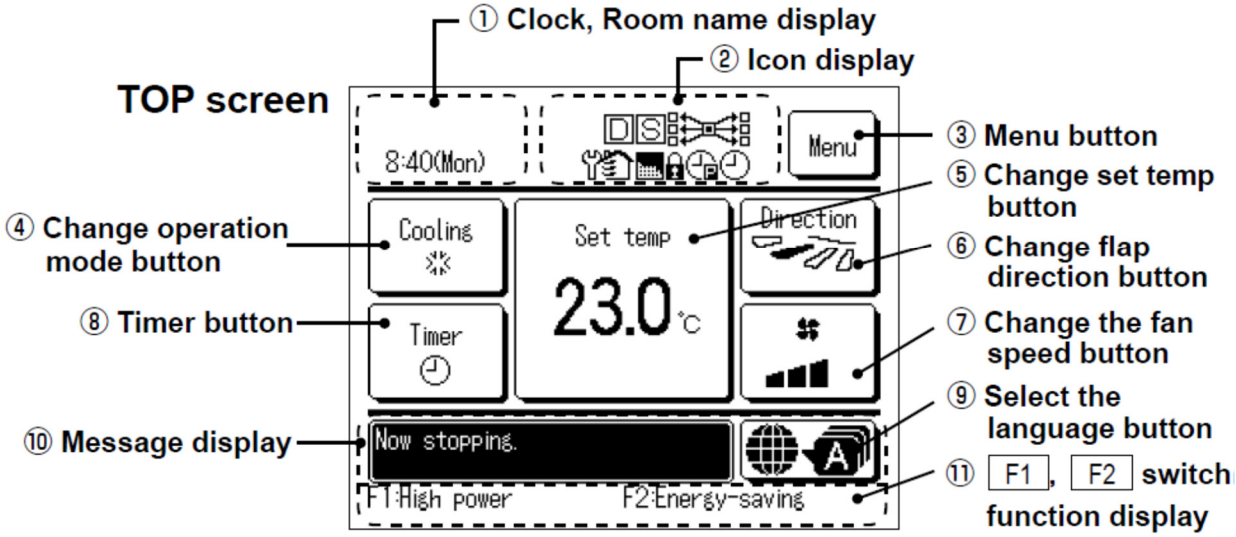
When peak-cut timer is set.

RC-EX3A Layout



Touch panel control, which is operated by tapping the LCD screen with a finger, is employed for all functions except 1: On/Off switch, 2: Programmable F1 switch and 3: Programmable F2 switch.

*All icons are shown for the sake of explanation.



When the demand control is effective.

When setting is made from the sub R/C.

During the ventilation operation

When "filter sign" is up.

When weekly timer is set.

When the central control (Optional) is running.

When the periodical inspection is necessary.

When the Permission/ Prohibition setting is made.

When peak-cut timer is set.

RC-EX OPERATION DATA

To access the RC-EX Remote Controls Operation Data function, press 'MENU' on the MASTER remote control front screen.
Then press 'NEXT' followed by 'SERVICE' (RC-EX3 only), then 'SERVICE & MAINTENANCE'.
Enter the service pass code, press 'SET' then press 'OPERATION DATA'. You can then select the indoor unit you want to view.

Operation Data Description and RAC Unit Compatibility				
No.	**Displayed Ref**	**Units**	**Description**	**RAC Compatibility**
1	MODE		Current operation mode	ok
2	SET TEMP	℃	Set temperature	ok
3	RETURN AIR	℃	Return air sensor temperature	ok
4	SENSOR	℃	Remote control sensor temperature	ok
5	THI-R1	℃	Indoor heat exchanger sensor (on U bend)	ok
6	THI-R2	℃	Indoor heat exchanger sensor (on Capillary)	ok
7	THI-R3	℃	Indoor heat exchanger sensor (on suction header)	-
8	I/U FANSPEED		Indoor unit fan speed	-
9	DEMAND	Hz	Required frequency	-
10	ANSWER	Hz	Response frequency	-
11	I/U EEV	PULSE	Pulse rate of KX indoor unit expansion valve	-
12	TOTAL I/U RUN	Hr	Total running hours of the indoor unit	-
21	OUTDOOR	℃	Outdoor air temperature	ok
22	THO-R1	℃	Outdoor unit heat exchanger sensor	ok
23	THO-R2	℃	Outdoor unit heat exchanger sensor	-
24	COMP	Hz	Compressor frequency	ok
25	HP	MPa	High pressure (x10=Bar)	-
26	LP	MPa	Low pressure (x10=Bar)	-
27	Td	℃	Discharge Pipe Temperature	ok
28	COMP BOTTOM	℃	Compressor base temperature	-
29	CT	Amp	Current	ok
30	TARGET SH	℃	Target Super Heat	-
31	SH	℃	Super Heat temperature	-
32	TDSH	℃	Compressor discharge pipe super heat	ok
33	PROTECTION No		Protection state number of the compressor	-
34	O/U FANSPEED		Outdoor unit fan speed	ok
35	63H1		63H1 High pressure switch on/off	-
36	DEFROST		Defrost control on/off	ok
37	TOTAL COMP RUN	Hr	Total running hours of compressor	-
38	O/U EEV1	PULSE	Pulse rate of the outdoor unit expansion valve EEVC	ok
39	O/U EEV2	PULSE	Pulse rate of the outdoor unit expansion valve EEVH	-

Details of 33 Compressor Protection Status	
No.	Contents of display
0	Normal
1	Discharge pipe temperature protection control
2	Discharge pipe temperature anomaly
3	Current safe control of inverter primary current
4	High pressure protection control
5	High pressure anomaly
6	Low pressure protection control
7	Low pressure anomaly
8	Anti-frost prevention control
9	Current cut
10	Power transistor protection control
11	Power transistor anomaly (Overheat)
12	Compression ratio control
13	-
14	Condensation prevention control
15	Current safe control of inverter secondary current
16	Stop by compressor rotor lock
17	Stop by compressor startup failure

RAC INDICATION & FAULT CODES

Inverter RAC Indoor Unit / Inverter RAC Outdoor Unit				
		SRK	ZD, ZE, ZE-S1, ZG, ZJ, ZJ-S1, ZM, ZR, ZS, ZMP, ZSP, ZFX, ZGX, ZHX, ZIX, ZJX, ZJX-S1, ZMX, ZSX	
		SRR/ SRF	ZIX, ZJX, ZJX-S1,ZMX	
		SRC	ZD, ZE, ZE-S1, ZG, ZJ, ZJ-S1, ZM, ZR, ZS, ZMP, ZSP, ZFX, ZGX, ZHX, ZIX, ZJX, ZJX-S1, ZMX, ZSX	

Indoor Unit Display		Outdoor Control PCB,	Wired Remote Control	Description of Trouble	Possible Cause
Run Light	Timer Light				
Green	Amber	Red LED			
0.5s / 0.5s	-	-	-	-	Invalid Operation (SCM multsplit)
1.5s / 0.5s	-	-	-	-	Pre- Heat operation (Fan stopped to prevent cold draught on heating start)
3s / 1s	-	-	-	-	Clean Mode Active
3.5s / 0.5s	-	-	-	-	Auto OFF during Stand By
-	ON	-	-	-	Timer Mode Active (ON/OFF/Weekly/Sleep)
OFF	Flashing	-	E21	Limit Switch error	Defective limit switch, air inlet panel set, I/D control PCB
1x	ON	-	-	Heat exchanger sensor (1) error	Broken heat exchanger sensor (1) wire, poor connection
2x	ON	-	E7	Room temperature sensor	Broken room temperature sensor wire, poor connection
2x	2x	7x	E60	Rotor lock	Faulty compressor, open phase on compressor, faulty outdoor P.C.B.
3x	ON	-	-	Heat exchanger sensor (2) error	Broken heat exchanger sensor (2) wire, poor connection
4x	ON	-	E9	Drain Fault	Float switch activated, faulty pump, faulty PCB, faulty float switch
5x	ON	2x	E47	Active Filter voltage error	Defective Active Filter, incorrect power supply
6x	ON	-	E16	Indoor fan motor error	Fault indoor fan motor, poor connection
7x	ON	2x	E57	Refrigeration system protective control	Service valve closed, refrigerant insufficient
7x	1x	4x	E40	Service valve (gas side) closed, defective outdoor PCB	Output current of inverter exceeds specification
Flashing	1x	8x	E38	Outdoor air temp sensor	Broken sensor wire, poor connection
Flashing	2x	8x	E37	Outdoor heat exchanger sensor	Broken sensor wire, poor connection
Flashing	4x	8x	E39	Discharge pipe sensor	Broken sensor wire, poor connection
ON	1x	1x	E42	Current Cut	Compressor locking, open phase on compressor output, short circuit on power transistor, closed service valve, EEV not opening
ON	2x	2x	E59	Trouble of outdoor unit	Broken compressor wire, broken power transistor, broken discharge sensor wire/poor connection, compressor blockage
ON	3x	3x	E58	Current safe stop	Overload protection, over charged, compressor locking
ON	4x	1x	E51	Power Transistor error	Faulty power transistor
ON	5x	5x	E36	Over heat of compressor	Low on gas, faulty discharge pipe senor, closed service valve
ON	6x	6x	E3 / E5	Error of signal transmission	Defective power supply, broken signal wire, faulty indoor/outdoor P.C.B.
ON	7x	ON	E48	Faulty outdoor fan motor	Faulty condenser fan motor, poor connection
ON	Flashing	2x	E35	Cooling High Pressure Protection	Overload protection, over charged, broken outdoor heat exchanger sensor wire, closed service valve

On the SRK ZSX-S, ZSX-S1, ZSX-W the GREEN operation LED will change to BLUE when operating in “ECO” mode.

RAC MULTISPLIT INDICATION & FAULT CODES

Inverter Multi Indoor	SRK	ZJ-S, ZJ-S1 ,ZM-S, ZS-S	ZJX-S, ZJX-S1, ZMX-S, ZSX-S	ZK-S,ZM-S,ZR-S
	SKM	ZSP-S		
	SRR	ZJ-S, ZM-S		
	SRF	ZJX-S, ZJX-S1, ZMX-S		
	FDTC	VD,VF, VF/1, VH		
	FDUM	VF, VF/1, VG		
	FDEN	VD, VF, VF/1, VG		
Inverter Multi Outdoor	SCM	ZJ-S, ZJ-S1, ZM-S, ZS-S		

Indoor Unit Display		Outdoor Control PCB, Red LED	Wired Remote Control	Description of Trouble	Possible Cause
Run Light Green	Timer Light Amber				
0.5s / 0.5s	-	-	-	Invalid Operation	Unit is connected to SCM Multisplit which is operating in a mode different to the mode requested.
1.5s / 0.5s	-	-	-	-	Pre- Heat operation (Fan stopped to prevent cold draught on heating start)
3s / 1s	-	-	-	-	Clean Mode Active
3.5s / 0.5s	-	-	-	-	Auto OFF during Stand By
-	ON	-	-	-	Timer Mode Active (ON/OFF/Weekly/Sleep)
-	-	8	E54	High pressure sensor	Faulty high pressure sensor, faulty control PCB.
-	Flashing	-	E21	Limit switch error	Defective limit switch, air inlet panel set, I/D control PCB
1x	ON	OFF	-	Indoor heat exchanger sensor 1 error	Broken heat exchanger sensor (1) wire, poor connection
2x	ON	OFF	-	Room temperature sensor	Broken room temperature sensor wire, poor connection
2x	2x	7x	E60	Rotor lock	Faulty compressor, open phase on compressor, faulty outdoor P.C.B.
3x	ON	OFF	-	Indoor heat exchanger sensor 2 error	Broken heat exchanger sensor 3 wire, poor connection
4x	ON	OFF	E9	Drain error	Blocked drain, faulty float switch, faulty drain pump
5x	ON	2x	E47	Active filter voltage error	Defective Active Filter, incorrect power supply
6x	ON	OFF	E16	Indoor fan motor error	Faulty indoor fan motor, poor connection
7x	ON	2x	E57	Refrigerant cycle system protective control	Closed service valve, insufficient refrigerant
Flashing	1x	8x	E38	Outdoor air temperature sensor	Broken sensor wire, poor connection, faulty outdoor PCB
Flashing	2x	8x	E37	Outdoor heat exchanger sensor	Broken sensor wire, poor connection, faulty outdoor PCB
Flashing	4x	8x	E39	Discharge pipe sensor	Broken sensor wire, poor connection, faulty outdoor PCB
Flashing	5x	8x	E53	Outdoor suction sensor	Broken sensor wire, poor connection, faulty outdoor sub PCB
ON	1x	x1	E42	Current Cut	Compressor locking, open phase on compressor output, short circuit on power transistor, closed service valve
ON	2x	2x	E59	Trouble of outdoor unit	Broken compressor wire, broken power transistor, broken discharge sensor wire or poor connection, compressor blockage
ON	3x	3x	E58	Current safe stop	Overload protection, over charged, compressor locking
ON	4x	1x	E51	Power transistor error	faulty inverter PCB, faulty main PCB or faulty fan motor
ON	5x	5x	E36	Over heat of compressor	Low on gas, faulty discharge pipe senor, closed service valve
ON	6x	6x	E5	Error of signal transmission	Defective power supply, broken signal wire, faulty indoor/outdoor P.C.B.
ON	7x	Flashing	E48	Outdoor fan motor or main PCB	Faulty condenser fan motor or faulty main PCB
ON	Flashing	2x	E35	Cooling High Pressure Protection	Overload protection, over charged, broken outdoor heat exchanger sensor wire, closed service valve

On the SRK ZSX-S, ZSX-S1, ZSX-W the GREEN operation LED will change to BLUE when operating in “ECO” mode.

RAC MULTISPLIT FAULT CODES - Historic Models

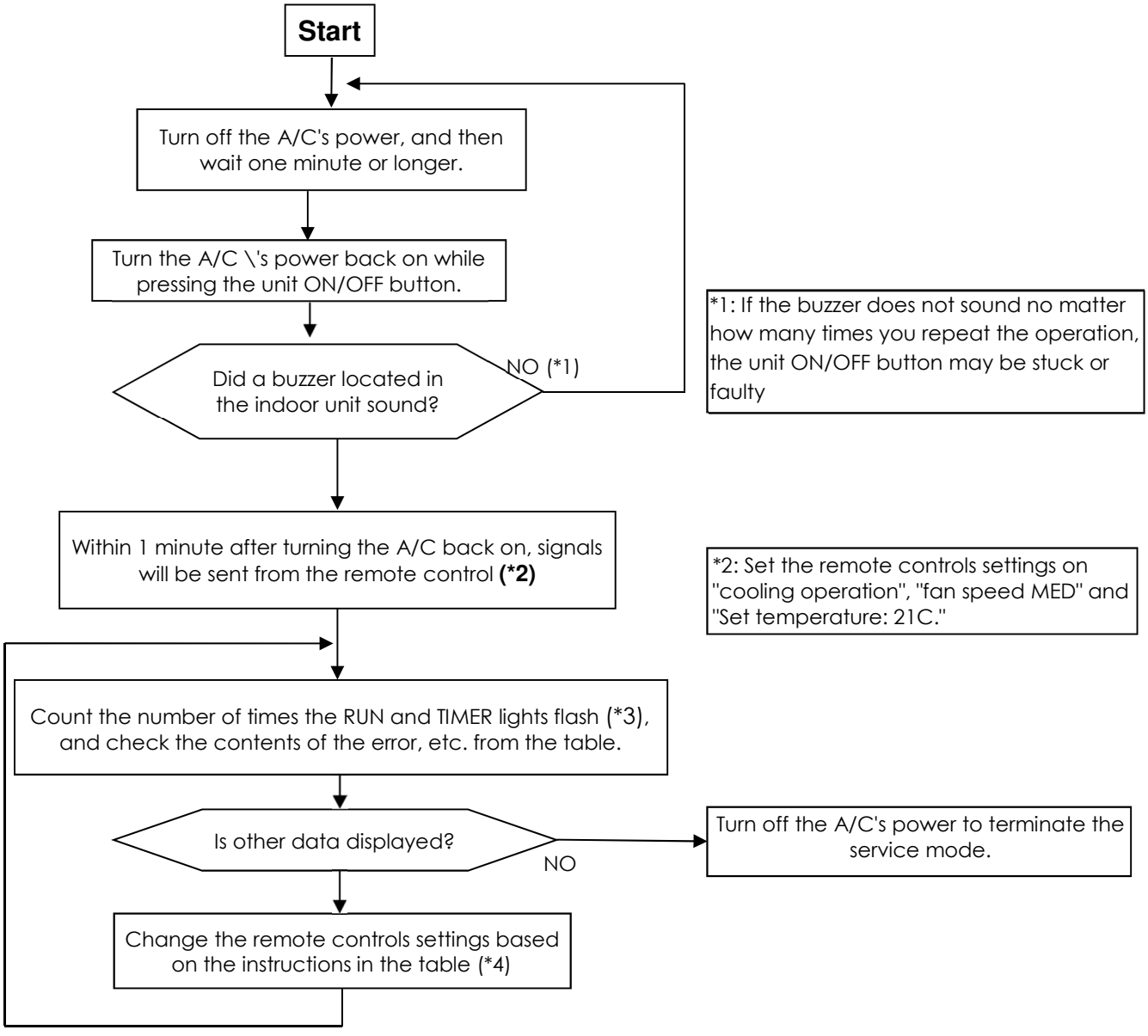
Inverter Multi Indoor	**SKM**	**ZD, ZF, ZG**
	SRRM	**ZE, ZF**
	STM	**ZE, ZF**
Inverter Multi Outdoor	**SCM**	**ZD-S, ZF-S, ZG-S**

Indoor Unit Display		Outdoor Control PCB, Red LED	Wired Remote Control	Description of Trouble	Possible Cause
Run Light Green	Timer Light Amber				
-	-	-	E1	Error of wired remote	Broken wire, faulty indoor P.C.B., faulty controller.
1x	ON	OFF	E6	Indoor heat exchanger sensor (1)	Broken heat exchanger sensor (1) wire, poor connection
2x	ON	OFF	E7	Room temperature sensor	Broken room temperature sensor wire, poor connection
2x	2x	7x	E60	Rotor lock	Faulty compressor, open phase on compressor, faulty outdoor P.C.B.
4x	ON	OFF	E9	Drain error	Blocked drain, faulty float switch, faulty drain pump
5x	ON	OFF	E6	Indoor heat exchanger sensor (2)	Broken heat exchanger sensor (2) wire, poor connection
6x	ON	OFF	E16	Indoor fan motor error	Fault indoor fan motor, poor connection
7x	ON	OFF	E6	Closed service valve, indoor heat exchanger sensor (1)	Closed service valve, indoor heat exchanger disconnected or open circuit
Flashing	1x	Flashing	E38	Outdoor air temperature sensor	Broken sensor wire, poor connection
Flashing	2x	Flashing	E37	Outdoor heat exchanger sensor	Broken sensor wire, poor connection
Flashing	4x	4 sec on/off	E39	Discharge pipe sensor	Broken sensor wire, poor connection
Flashing	5x	Flashing	E53	Compressor suction sensor	Broken sensor wire, poor connection
Flashing	6x	Flashing	E41	Power transistor sensor error	Broken sensor wire, poor connection
ON	1x	1x	E42	Current Cut	Compressor locking, open phase on compressor output, short circuit on power transistor, closed service valve
ON	2x	2x	E59	Trouble of outdoor unit	Broken compressor wire, broken power transistor, broken discharge sensor wire or poor connection, compressor block age
ON	3x	3x	E58	Current safe stop	Overload protection, over charged, compressor locking
ON	4x	4x	E41	Power transistor error	Broken power transistor
ON	5x	5x	E36	Over heat of compressor	Low on gas, faulty discharge pipe senor, closed service valve
ON	6x	6x	E5	Error or signal transmission	Defective power supply, broken signal wire, faulty indoor/outdoor P.C.B.
ON	7x	ON	E48	Faulty outdoor fan motor	Faulty condenser fan motor, poor connection

SRF, SRK and SRR Inverter Split Systems - SERVICE MODE – R32 and R410A Models Only

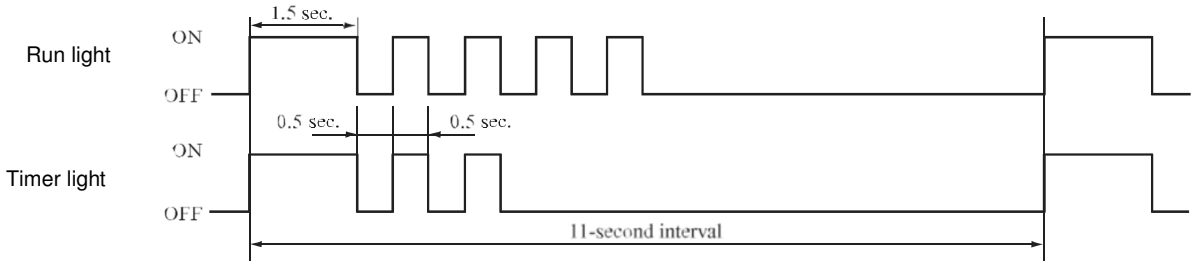
Term	Explanation
Service Mode	The service mode is the mode where service data are displayed by flashing lights when the operations described below are performed with the indoor controller
Service Data	These are the contents of error displays and protective stops which occurred I the past in the system. Error display contents and protective stop data from past anomalous operations are saved in the indoor unit controller's non-volatile memory. There are two types of data, self-diagnosis data and stop data.
Self-Diagnosis Data (Error code)	These are the data which display error display (self-diagnosis display) occurred in an indoor unit. Data are recorded for up to 5 previous occurrences. Data which is older than the 5th previous occurrence are erased. In addition, data on the temperature of each sensor are recorded when trouble occurs, so more detailed information can be checked.
Stop Data (Stop code)	These are the data which display the reason by which a stop occurred when the system performed protective stops, etc. in the past. If stop data alone are generated, the system restarts automatically. Data older than the 10th previous occasion are erased. (Important) In cases where transient stop data only are generated, the system may still be normal. However, if the same protective stop occurs frequently (3 or more times), it could lead to customer complaints

Service mode display procedure



*3: To Count the number of flashes in the service mode, count the number of flashes after the light lights up for 1.5 sec initially (start signal). Do not count start signal.

- In the case of current cut (example: stop code "42")
  The RUN light (10's digit) flashes 4 times and the TIMER light (1's digit) flashes 2 times.
  4 x 10 + 2 x 10 = 42 > from the table, read the instructions for error code 42, "current cut".



*4: When in the service mode, when the remote control settings (operation switching, fan speed switching, temperature setting) are set as shown in the following table and sent to the air conditioner unit, the unit switches to display of service data.

SELF-DIAGNOSTIC DATA		
Remote Control Setting		Contents of Output Data
Operation Mode	Fan Speed	
Cooling	MED	Displays the reason for stopping display in the past (error code).
	HI	Displays the room temp sensor reading at the time the error code was displayed in the past.
	AUTO	Displays indoor heat exchanger sensor temp at the time the error code was displayed in the past.
Heating	LO	Displays the remote control information at the time the error code was displayed in the past.
	MED	Displays the outdoor air temp sensor reading at the time the error code was displayed in the past.
	HI	Displays the outdoor heat exchanger sensor temp at the time the error code was displayed in the past.
	AUTO	Displays the discharge pipe sensor temp at the time the error code was displayed in the past.

Remote Control Temp Setting	When Error Occurred
21ºC	Previous time
22ºC	2nd previous time
23ºC	3rd previous time
24ºC	4th previous time
25ºC	5th previous time

Only for Indoor Heat Exchanger 2 (ZHX, ZIX, ZJ, ZJX, ZK, ZL)	
Remote Control Temp Setting	When error occurred
26ºC	Previous time
27ºC	2nd previous time
28ºC	3rd previous time
29ºC	4th previous time
30ºC	5th previous time

ERROR CODE DATA			
Remote Control Setting			Displayed Data
Operation Switching	Fan Speed Switching	Temperature Setting	
Cooling	Medium	21ºC	Displays the reason for the stop the previous time an error code was displayed
		22ºC	Displays the reason for the stop 2 times previous time an error was displayed
		23ºC	Displays the reason for the stop 3 times previous time an error was displayed
		24ºC	Displays the reason for the stop 4 times previous time an error was displayed
		25ºC	Displays the reason for the stop 5 times previous time an error was displayed

STOP DATA			
Remote Control Setting			Displayed Data
Operation Switching	Fan Speed Switching	Temperature Setting	
Cooling	LO	21ºC	Displays the stop code the previous time when the A/C was stopped by protective control.
		22ºC	2 times previous
		23ºC	3 times previous
		24ºC	4 times previous
		25ºC	5 times previous
		26ºC	6 times previous
		27ºC	7 times previous
		28ºC	8 times previous
		29ºC	9 times previous
		30ºC	10 times previous

Remote Control Information Tables			
Display pattern when in Service Mode			
RUN light [i] Operation switching	Operation switching when there is an abnormal stop	TIMER light [ii] Fan Speed Switching	Fan Speed Switching when there is an abnormal stop
0	AUTO	0	AUTO
1	DRY	2	HI
2	COOL	3	MED
3	FAN	4	LO
4	HEAT	6	HI POWER
		7	ECONO

SENSOR TABLE											
Room temperature sensor, indoor heat exchanger sensor, outdoor air temperature sensor, outdoor heat exchanger sensor.											
Buzzer sound	Run light (10's digit)	Timer Light (1's digit)									
		0	1	2	3	4	5	6	7	8	9
Yes (sounds for 0.1 second)	6	-60	-61	-62	-63	-64					
	5	-50	-51	-52	-53	-54	-55	-56	-57	-58	-59
	4	-40	-41	-42	-43	-44	-45	-46	-47	-48	-49
	3	-30	-31	-32	-33	-34	-35	-36	-37	-38	-39
	2	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29
	1	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19
	0	0	-1	-2	-3	-4	-5	-6	-7	-8	-9
No (does not sound)	0	0	1	2	3	4	5	6	7	8	9
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49
	5	50	51	52	53	54	55	56	57	58	59
	6	60	61	62	63	64	65	66	67	68	69
	7	70	71	72	73	74	75	76	77	78	79
	8	80	81	82	83	84	85	86	87	88	89
	9	90	91	92	93	94	95	96	97	98	99

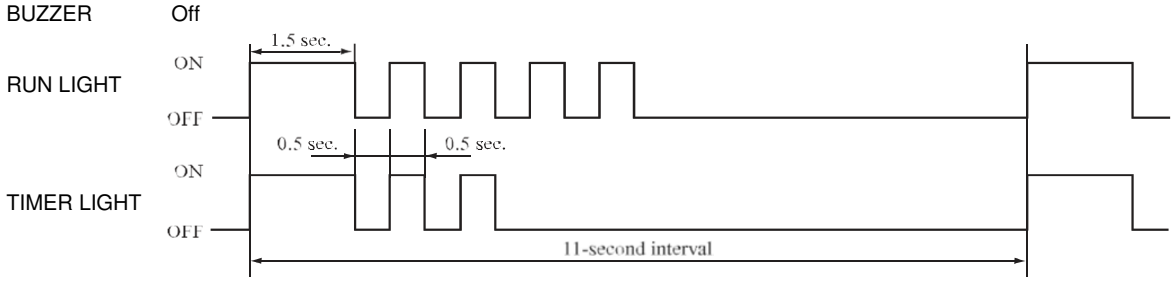
SENSOR TABLE											
Discharge Pipe Sensor											
Buzzer sound	Run light (10's digit)	Timer Light (1's digit)									
		0	1	2	3	4	5	6	7	8	9
Yes (sounds for 0.1 second)	3	-60	-62	-64							
	2	-40	-42	-44	-46	-48	-50	-52	-54	-56	-58
	1	-20	-22	-24	-26	-28	-30	-32	-34	-36	-38
	0	0	-2	-4	-6	-8	-10	-12	-14	-16	-18
No (does not sound)	0	0	2	4	6	8	10	12	14	16	18
	1	20	22	24	26	28	30	32	34	36	38
	2	40	42	44	46	48	50	52	54	56	58
	3	60	62	64	66	68	70	72	74	76	78
	4	80	82	84	86	88	90	92	94	96	98
	5	100	102	104	106	108	110	112	114	116	118
	6	120	122	124	126	128	130	132	134	136	138
	7	140	142	144	146	148	150				

- If no data is recorded (error code is normal), the information display in the remote control becomes as follows.

Sensor name	Sensor value displayed when the error code is normal
Room temperature sensor	-64ºC
Indoor heat exchanger sensor	-64ºC
Outdoor air temperature sensor	-64ºC
Outdoor heat exchanger sensor	-64ºC
Discharge pipe sensor	-64ºC

- EXAMPLE - Outdoor air sensor temperature “42 ºC”

  When the temperature value is ≧0, the buzzer does not sound. Run light x4 flashes and Timer light flashes twice.



No Buzzer, Run light x 4, Timer light x 2.

SERVICE DATA RECORD FORM

Customer		**Model number**	
Date of Investigation		**Serial number**	
Content of Complaint			

Remote Control Settings			**Content of displayed data**	**Display results**			**Display content**
Temp setting	**Operation Mode**	**Fan speed Setting**		**Buzzer Yes/No**	**RUN light (Times)**	**TIMER light (Times)**	
21	Cooling	MED	Error code on previous occasion				
		HI	Room temperature sensor on previous occasion				
		AUTO	Indoor heat exchanger sensor 1 on previous occasion				
	Heating	LO	Remote control information on previous occasion				
		MED	Outdoor air temperature sensor on previous occasion				
		HI	Outdoor heat exchanger sensor on previous occasion				
		AUTO	Discharge pipe sensor on previous occasion				
26	Cooling	AUTO	Indoor heat exchanger sensor 2 on previous occasion				
22	Cooling	MED	Error code on 2nd previous occasion				
		HI	Room temperature sensor on 2nd previous occasion				
		AUTO	Indoor heat exchanger sensor 1 on 2nd previous occasion				
	Heating	LO	Remote control information on 2nd previous occasion				
		MED	Outdoor air temperature sensor on 2nd previous occasion				
		HI	Outdoor heat exchanger sensor on 2nd previous occasion				
		AUTO	Discharge pipe sensor on 2nd previous occasion				
27	Cooling	AUTO	Indoor heat exchanger sensor 2 on 2nd previous occasion				
23	Cooling	MED	Error code on 3rd previous occasion				
		HI	Room temperature sensor on 3rd previous occasion				
		AUTO	Indoor heat exchanger sensor 1 on 3rd previous occasion				
	Heating	LO	Remote control information on 3rd previous occasion				
		MED	Outdoor air temperature sensor on 3rd previous occasion				
		HI	Outdoor heat exchanger sensor on 3rd previous occasion				
		AUTO	Discharge pipe sensor on 3rd previous occasion				
28	Cooling	AUTO	Indoor heat exchanger sensor 2 on 3rd previous occasion				
24	Cooling	MED	Error code on 4th previous occasion				
		HI	Room temperature sensor on 4th previous occasion				
		AUTO	Indoor heat exchanger sensor 1 on 4th previous occasion				
	Heating	LO	Remote control information on 4th previous occasion				
		MED	Outdoor air temperature sensor on 4th previous occasion				
		HI	Outdoor heat exchanger sensor on 4th previous occasion				
		AUTO	Discharge pipe sensor on 4th previous occasion				
29	Cooling	AUTO	Indoor heat exchanger sensor 2 on 4th previous occasion				
25	Cooling	MED	Error code on 5th previous occasion				
		HI	Room temperature sensor on 5th previous occasion				
		AUTO	Indoor heat exchanger sensor 1 on 5th previous occasion				
	Heating	LO	Remote control information on 5th previous occasion				
		MED	Outdoor air temperature sensor on 5th previous occasion				
		HI	Outdoor heat exchanger sensor on 5th previous occasion				
		AUTO	Discharge pipe sensor on 5th previous occasion				
30	Cooling	AUTO	Indoor heat exchanger sensor 2 on 5th previous occasion				
21	Cooling	LO	Stop code on previous occasion				
22			Stop code on 2nd previous occasion				
23			Stop code on 3rd previous occasion				
24			Stop code on 4th previous occasion				
25			Stop code on 5th previous occasion				
26			Stop code on 6th previous occasion				
27			Stop code on 7th previous occasion				
28			Stop code on 8th previous occasion				
29			Stop code on 9th previous occasion				
30			Stop code on 10th previous occasion				
Judgement							
Remarks							

SERVICE MODE ERROR CODE & STOP CODE TABLE						
Models		**SRK**	**ZD-S, ZF-S, ZG-S**		**ZFX-S, ZGX-S**	**ZE-S, ZE-S1**
Number of Flashes (in Service Mode)		**Stop or Error Code**	**Error Content**		**Cause**	**Occurrence Conditions**
Run LED (Green)	**Timer LED (Amber)**		**Major Category**	**Minor Category**		
1x	1x	11	Current Cut	Compressor software start	Comp Lock, Wiring short, Comp output is open phase, Outdoor PCB faulty	Compressor start fails 42 times in succession and the final failure is current cut.
	2x	12		With Compressor Speed Lower than 20 rps	Service valve closed, Compressor output open phase, EEV faulty	After the compressor starts, it stops due to current cut at less than 20 rps
	3x	13		With Compressor Speed 20 rps or higher	Service valve closed, Compressor output open phase, EEV faulty	When operation is stopped by current cut at 20 rps or higher.
	4x	14		Excessive voltage (DC 350V)	Outdoor PCB faulty, Power supply abnormal	When the DC voltage (DC 280V) exceeds 350V
	5x	15		Short circuit in power transistor (high side)	Outdoor PCB faulty, power transistor damaged	When it is judged that the power transistor was damaged at the time the compressor started
	6x	16		Current cut circuit breakdown	Outdoor PCB faulty, power transistor damaged	
2x	1x	21	Outdoor unit error	PWM calculation results are abnormal	Compressor wires are disconnected, Power transistor is damaged	When PWM calculation results are 0% continued for 3 minutes or longer
	2x	22		Input is 2A or lower (PWM 90% or higher)	Compressor wires are disconnected, outdoor PCB is faulty	When PWM calculation results of 90% and an input current lower than the set valve continue for 3 minutes or longer
	3x	23		Abnormal stop 3 times in 20 minutes	Service valve is closed. Compressor output is open phase. Electronic expansion valve is faulty. Low on gas.	When an abnormal stop occurs 3 times with automatic recovery within 20 minutes after the outdoor unit's power supply was turned on.
	9x	29		Voltage drop	Power supply is faulty. Outdoor PCB is faulty	When the power supply voltage drops during operation.
	7x	27	Outdoor fan motor error	Outdoor unit's fan motor is abnormal (DC motor only)	Outdoor fan motor faulty. Poor connection. Faulty outdoor PCB	When a fan speed of 75rpm or lower continues for 30 seconds or longer.
3x	1x	31	Current Safe	Cooling current safe 1	Overcharge. Compressor lock	When there is a current safe stop in current safe mode 1 mode during cooling operation
	2x	32		Heating current safe 1		When there is a current safe stop in current safe mode 1 mode during heating operation
	3x	33		Cooling current safe 2		When there is a current safe stop in current safe mode 2 mode during cooling operation
	4x	34		Heating current safe 2		When there is a current safe stop in current safe mode 2 mode during heating operation

SERVICE MODE ERROR CODE & STOP CODE TABLE						
Models		**SRK**	**ZD-S, ZF-S, ZG-S**		**ZFX-S, ZGX-S**	**ZE-S, ZE-S1**
Number of Flashes (in Service Mode)		**Stop or Error Code**	**Error Content**		**Cause**	**Occurrence Conditions**
Run LED (Green)	**Timer LED (Amber)**		**Major Category**	**Minor Category**		
3x	5x	35	Current Safe	Cooling current safe 3	Overcharge. Compressor lock	When there is a current safe stop in current safe mode 3 mode during cooling operation
	6x	36		Heating current safe 3		When there is a current safe stop in current safe mode 3 mode during heating operation
	7x	37		Heating current safe 3 + 3A		When there is a current safe stop in current safe mode 3 + 3A mode during heating operation
4x	1x	41	Current Safe	Cooling overload 1 (outdoor temp 36~40*C)	Overcharge. Compressor lock. Overload operation	When there is a current safe stop in overload 1 mode during cooling operation
	2x	42		Heating overload 1 (outdoor temp 5~12*C)		When there is a current safe stop in overload 1 mode during heating operation
	3x	43		Cooling overload 2 (outdoor temp 40~45*C)		When there is a current safe stop in overload 2 mode during cooling operation
	4x	44		Heating overload 2 (outdoor temp 12~17*C)		When there is a current safe stop in overload 2 mode during heating operation
	5x	45		Cooling overload 3 (outdoor temp 45*C~)		When there is a current safe stop in overload 3 mode during cooling operation
	6x	46		Heating overload 3 (outdoor temp 17*C~)		When there is a current safe stop in overload 3 mode during heating operation
5x	OFF	50	Compressor overheat	Discharge >110*C	Cooling problem	When the discharge pipe's sensor exceeds the set value
	1	51	Power transistor overheat	Power Transistor >110*C		When power transistor temp exceeds set value (compressor stops).
6x	OFF	60	Serial signal error	Signal not received for 1 min & 55 sec	Power supply faulty. Incorrect wiring. Indoor/ outdoor PCB faulty	When 1 min 55sec passes without communication from either the outdoor or indoor being
	1x	61		Faulty interconnect wiring	Connections between indoor and outdoor are faulty. Faulty indoor/ outdoor PCB	When 10 sec passes after the power is on without communication signals from the indoor/ outdoor unit being
	2x	62		Serial transmission error	Indoor/ outdoor PCB faulty. Noise causing faulty operation	When 1 min 50 sec passes without communication signals from either indoor or outdoor unit

SERVICE MODE ERROR CODE & STOP CODE TABLE						
Models		**SRK**	**ZD-S, ZF-S, ZG-S**		**ZFX-S, ZGX-S**	**ZE-S, ZE-S1**
Number of Flashes (in Service Mode)		**Stop or Error Code**	**Error Content**		**Cause**	**Occurrence Conditions**
Run LED (Green)	**Timer LED (Amber)**		**Major Category**	**Minor Category**		
7x	1x	71	Rotor lock	Less than 16 rps	Compressor faulty. Compressor output is open phase. EEV is faulty. Overload operation. Outdoor unit PCB is faulty.	After the compressor starts, when it stops at less than 16 rps due to rotor lock
	2x	72		16 rps or higher		When the comp stops at 16rps or higher due to rotor lock
	3x	73		Phase switching defects (U phase)	Compressor is faulty. Compressor wiring is faulty. Outdoor unit PCB is faulty	When compressor start fails 42 times in succession and the reason for the final failure is rotor lock.
	4x	74		Phase switching defects (V phase)		
	5x	75		Phase switching defects (W phase or can't distinguish)		
	6x	76		Comp software start (within 4 sec after phase switching)		
8x	OFF	80	Protective control operation	Indoor unit fan motor is abnormal	Faulty connection. Faulty fan motor. Indoor PCB faulty	When indoor fan motor is detected to be running at 300rpm or lower.
	1x	81		Discharge pipe sensor is abnormal (anomalous stop)	Senor wire disconnected faulty connection	When a disconnected signal (temp below 7*C) is sent for 15 sec or longer as the sensor data
	2x	82		Indoor heat exchanger sensor is abnormal (anomalous	Senor wire disconnected faulty connection	When a temperature of -20*C or lower is sensed cont. for 40 min during heating operation.
	3x	83		Outdoor heat exchanger sensor is abnormal (anomalous	Senor wire disconnected faulty connection	When a temperature or - 50*C or lower is sensed cont. for 40 min during heating operation.
	4x	84		Anti - condensation control	High humidity. Faulty humidity sensor	Anti-condensation prevention control is operating
	5x	85		Anti-frost control	Indoor fan speed drops. Indoor heat exchanger sensor short circuit	When the anti-frost control operates and the compressor stops during cooling operation.
	6x	86		High pressure control	Heating overload. Indoor fan speed drops. Indoor heat exchanger sensor short circuit	When high pressure control operates during heating operation and the comp stops.
	7x	87		Comp overheating protection control	Short of gas. Discharge pipe sensor is faulty. Closed service valve.	When compressor overheating protective control operates and the compressor stops.
	8x	88		Refrigeration cycle system protective control	Service valve closed. Short of gas.	When refrigerant cycle system protective control operates.

SERVICE MODE ERROR CODE & STOP CODE TABLE					
Models		**SRK**	**ZJ-S, ZJ-S1,ZM-S, ZS-S**	**ZHX-S, ZIX-S, ZJX-S,ZMX-S, ZSX-S**	**ZK-S, ZM-S, ZR-S**
Number of Flashes (in Service Mode)		**Stop or Error Code**	**Error Content**	**Cause**	**Occurrence Conditions**
Run LED (Green)	**Timer LED (Amber)**				
OFF	OFF	0	Normal	-	-
	5x	5	Cannot receive signals for 35 sec (if communications have recovered	Power supply is faulty. Power supply cables and signal lines are improperly wired. Indoor/ outdoor PCBs are faulty.	When 35 sec passes without communications signals from either the outdoor or indoor unit being detected correctly
3x	5x	35	Cooling high pressure control	Cooling overload operation. Outdoor fan speed drops. Outdoor heat exchanger sensor is short circuit.	When the outdoor heat exchanger sensor's value exceeds the set value.
	6x	36	Compressor over heat (115*C)	Low on gas. Discharge pipe sensor is faulty. Service valve is closed	When the discharge pipes sensor value exceeds the set value.
	7x	37	Outdoor heat exchanger sensor is abnormal.	Outdoor heat exchanger faulty. Poor connections	When a temp of -55*C or lower is sensed cont. for 20 sec while the power is on or after the outdoor units speed has continued at 0rps or higher for 2 min. (The comp stops)
	8x	38	Outdoor air temp sensor is abnormal	Outdoor air temp sensor wire is faulty. Poor connection	When a temp of -55*C or lower is sensed cont. for 20 sec while the power is on or after the outdoor units speed has continued at 0rps or higher for 2 min. (The comp stops)
	9x	39	Discharge pipe sensor is abnormal (anomalous stop)	Discharge pipe sensor wire is faulty. Poor connection	When a temp of -25*C or lower is sensed cont. for 20 sec after the outdoor units speed has continued at 0rps or higher for 10 min. (the comp stops)
4x	OFF	40	Service valve (gas side) closed	Service valve closed, or faulty outdoor PCB	If the inverter output current exceeds set value within 80 seconds, after compressor ON in heating
	2x	42	Current cut	Service valve closed. Compressor locked/faulty. Outdoor PCB faulty. EEV faulty.	Compressor start fails 42 times in succession and final reason for failure is current cut.
	7x	47	Active filter voltage error	Defective active filter.	When the wrong voltage connected for the power supply. When the outdoor control PCB is faulty.
	8x	48	Outdoor fan motor abnormal	Poor connection. Faulty fan motor. Faulty PCB.	When a fan speed of 75rpm or lower continues for 30 sec or longer.

SERVICE MODE ERROR CODE & STOP CODE TABLE					
Models		**SRK**	**ZJ-S, ZJ-S1,ZM-S, ZS-S**	**ZHX-S, ZIX-S, ZJX-S,ZMX-S, ZSX-S**	**ZK-S, ZM-S, ZR-S**
Number of Flashes (in Service Mode)		**Stop or Error Code**	**Error Content**	**Cause**	**Occurrence Conditions**
Run LED (Green)	**Timer LED (Amber)**				
5x	1x	51	Short circuit in the power transistor (high side) Current cut circuit	Outdoor PCB is faulty, power transistor damaged	When it is judged that the power transistor was damaged at the time the compressor started.
	7x	57	Refrigeration cycle system protective control	Service valve closed. Short of gas.	When the refrigeration cycle protective control operates
	8x	58	Current safe	Refrigerant is overcharged. Compressor locked. Overload operation.	When there is a current safe during operation.
	9x	59	Compressor wiring is disconnected. Voltage drop. Low speed protective control	Compressor wiring is disconnected. Power transistor is damaged. Power supply construction is defective. Outdoor PCB is faulty.	When the current is 1A or less at the time the compressor started. When the power supply voltage drops during operation. When the outdoor unit's speed is lower than 26rps for 60 min.
6x	OFF	60	Rotor lock	Overload operation. Faulty compressor. Faulty EEV. Faulty outdoor PCB.	After the compressor starts, when the compressor stops due to rotor lock.
	1x	61	Connection lines between the indoor & outdoor are faulty.	Connection line is faulty. Indoor or outdoor PCBs are faulty.	When 10 sec passes after the power on without communications signals from the indoor or outdoor being detected correctly
	2x	62	Serial signal error	Indoor or outdoor unit PCBs are faulty. Noise causing faulty operation.	When 7 min 35 sec passes without communication signals from indoor or outdoor unit being detected correctly.
8x	OFF	80	Indoor fan motor is faulty	Indoor fan motor is faulty. Poor connection. Faulty indoor PCB.	When the indoor fan motor is detected to be running at 300 rpm or lower
	2x	82	Indoor heat exchanger sensor abnormal	Indoor heat exchanger sensor wire faulty. Poor connection.	When a temp of -28*C or lower is sensed cont. for 40 min during heating.
	4x	84	Anti-condensation control	High humidity condition. Faulty humidity sensor.	Anti-condensation prevention control is operating.
	5x	85	Anti-frost control	Indoor fan speed drops. Indoor heat exchanger sensor is faulty	When the anti-frost control operates and the compressor stops during cooling operation.
	6x	86	Heating high pressure control	Heating overload operation. Indoor unit fan speed drops. Indoor heat exchanger sensor is short circuit.	When high pressure control operates during heating operation and the compressor stops.

PAC SELF-DIAGNOSIS INFORMATION						
Inverter PAC Indoor Units			FDT		V, VD, VF, VF/1, VG, VH	
			FDTC		V, VD, VF, VF/1, VH	
			FDU		VF, VF/1, VG	
			FDUM		1, 1R, V, VD, VF, VF/1, VG	
			FDE		VG	
			FDEN		V, VD, VF, VF/1	
			FDF		VD	
Error Code	Indoor PCB LEDs		Outdoor unit LEDs		Description of Fault	Possible Cause
	RED	GREEN (1)	RED	GREEN (1)		
No Error Code	Off	Flashing	Off	Flashing	-	Normal Operation
	Off	Off	2x	Off	Indoor unit power supply	Power OFF, broken wire, blown fuse, broken transformer wire
	3x	Flashing	Off	Flashing	Remote controller wires	Poor or wrong connection, broken wire
					Remote controller	Faulty Remote controller
"04 9F", "WAIT" or "INSPECT I/U"	Off	Flashing	2x	Flashing	Communication error (indoor-outdoor)	Faulty interconnect wiring, faulty PCB
					Remote Controller	Improper setting of master and slave by Remote Controller
E1	Off	Flashing	Off	Flashing	Communication error (indoor-remote control)	Poor or wrong connection, broken wire, intrusion of noise, faulty indoor PCB or remote control
E5	2x	Flashing	2x	Flashing	Indoor - Outdoor communication fault	Poor connection, incorrect wiring, indoor or outdoor PCB
	2x	Flashing	Off	Flashing	Electrical Noise	CPU Runaway on Outdoor control PCB
					Outdoor Control PCB	Faulty Outdoor Control PCB (Communication Circuit)
	2x	Flashing	Off	Off	Outdoor Control PCB	Faulty Outdoor Control PCB or Power supply
E6	1x	Flashing	Off	Flashing	Indoor heat exchanger temp sensor	Faulty sensor, poor connection, faulty indoor PCB
E7	1x	Flashing	Off	Flashing	Indoor return air temp sensor	Faulty sensor, poor connection, faulty indoor PCB
E8	1x	Flashing	Off	Flashing	Indoor heat exchanger temp sensor	Heating overload, faulty sensor, faulty indoor PCB
E9	1x	Flashing	Off	Flashing	Float switch activated	Blocked drain, faulty pump, faulty indoor PCB, faulty float switch
E10	Off	Flashing	Off	Flashing	No. of indoor units connected	Too many units connected to 1 controller (MAX 16)
E14	3x	Flashing	Off	Flashing	Remote controller Fault	No master assigned to slaves, incorrect wiring, broken wire between master & slave
E16	1x	Flashing	Off	Flashing	Indoor fan motor	Faulty Indoor fan motor, poor connection, faulty indoor PCB
E18	1x	Flashing	Off	Flashing	Address Setting Error	Address setting error of master and slave indoor units
E19	1x	Flashing	Off	Flashing	Mode Setting	Incorrect mode setting
E20	1x	Flashing	Off	Flashing	Indoor fan motor	Fan motor speed fault or faulty indoor Power PCB
E21	1x	Flashing	Off	Flashing	Panel Limit Switch error	Defective limit switch, air inlet panel set, I/D control PCB
E28	Off	Flashing	Off	Flashing	Remote Controller temp sensor	Faulty Remote controller temp sensor

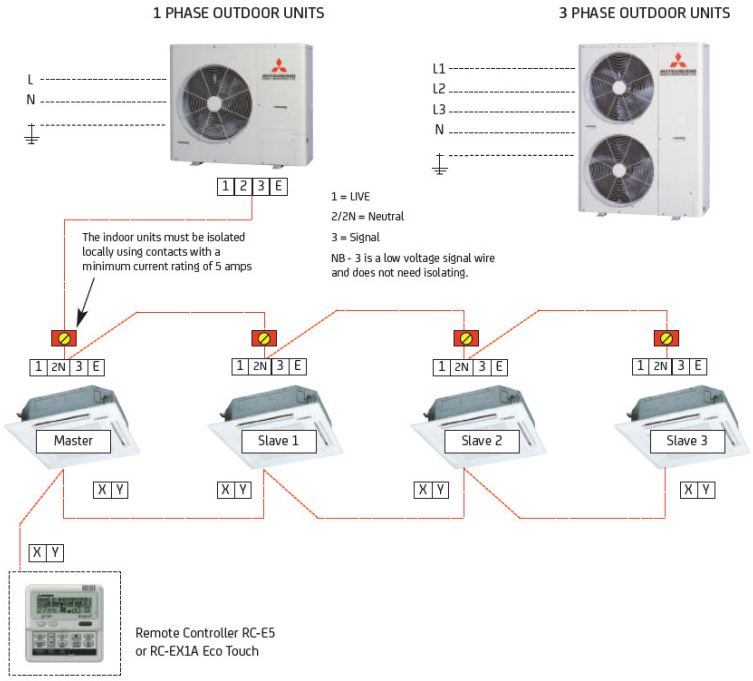
PAC SELF-DIAGNOSIS INFORMATION					
Inverter PAC Outdoor			**SRC**		**ZHX-S, ZIX-S, ZJX-S, ZMX-S, ZSX-S**
Error Code	**Indoor Unit Display**		**Outdoor Control PCB, Red LED**	**Location of trouble**	**Description of trouble**
	Run Light Green	**Timer Light Amber**			
E35	Off	Flashing	2x	Installation, operation status	Higher outdoor heat exchanger temp
				Outdoor heat exchanger temp sensor	Faulty outdoor heat exchanger temp sensor
				Outdoor control PCB	Faulty outdoor control PCB (temperature sensor input circuit)
E36	Off	Flashing	5x	Installation, operation status	Higher discharge temperature
				Discharge pipe temperature sensor	Faulty discharge pipe sensor
				Outdoor control PCB	Faulty outdoor control PCB (temperature sensor input circuit)
E37	Off	Flashing	8x	Outdoor heat exchanger temp sensor	Faulty outdoor heat exchanger temp sensor, broken wire or poor connection
				Outdoor control PCB	Faulty outdoor control PCB (temperature sensor input circuit)
E38	Off	Flashing	8x	Outdoor air temperature sensor	Faulty outdoor air temp sensor, broken wire or poor connection
				Outdoor control PCB	Faulty outdoor control PCB (temperature sensor input circuit)
E39	Off	Flashing	8x	Discharge pipe temperature sensor	Faulty discharge pipe sensor, broken wire, poor connection
				Outdoor control PCB	Faulty outdoor control PCB (temperature sensor input circuit)
E42	Off	Flashing	1x	Outdoor control PCB, compressor	Current cut (anomalous compressor over current)
				Installation, operation status	Service valve closing operation
E47	Off	Flashing	2x	Outdoor control PCB, power transistor	Anomalous inverter over current
E48	Off	Flashing	Flashing	Outdoor fan motor	Faulty outdoor fan motor
				Outdoor control PCB	Faulty outdoor control PCB
E51	Off	Flashing	1x	Power transistor, outdoor control PCB	Power transistor error
E57	Off	Flashing	2x	Operation status	Shortage of refrigerant
				Installation status	Service valve closed
E58	Off	Flashing	3x	Current safe stop	Overload operation, over charge, compressor locking
E59	Off	Flashing	2x	Compressor, outdoor control PCB	Anomalous compressor start up
E60	Off	Flashing	7x	Compressor	Anomalous compressor rotor lock

PAC SELF-DIAGNOSIS INFORMATION							
Inverter PAC Outdoor			**FDCVA**			**HEN, HENR, HENAR, HES, HESR, HESAR**	
			FDC			**VN, VNA, VNP, VS, VSA, VNX, VSX**	
Error Code	**Indoor PCB LEDs**		**Outdoor unit LEDs**			**Description of Fault**	**Possible Cause**
	RED	**GREEN (1)**	**RED**	**GREEN (1)**	**INV LED**		
E33	Off	Flashing	1x	Flashing	-	Power supply	Anomalous current on inverter primary side
E34	Off	Flashing	1x	Flashing	Flashing	Power supply	Phase open circuit, faulty outdoor control PCB (3 Phase model)
E35	Off	Flashing	1x	Flashing	Flashing	Outdoor heat exchanger thermistor	Overheat of condenser, faulty thermistor, faulty outdoor PCB
E36	Off	Flashing	1x	Flashing	Flashing	Discharge pipe thermistor	High discharge temp, faulty sensor, faulty outdoor control PCB
E37	Off	Flashing	1x	Flashing	Flashing	Outdoor heat exchanger thermistor	Poor connection, broken wire, faulty thermistor, faulty PCB
E38	Off	Flashing	1x	Flashing	Flashing	Outdoor ambient air sensor	Poor connection, broken wire, faulty thermistor, faulty PCB
E39	Off	Flashing	1x	Flashing	Flashing	Discharge pipe thermistor	Poor connection, broken wire, faulty thermistor, faulty PCB
E40	Off	Flashing	1x	Flashing	Flashing	High Pressure Error	Activation of HP switch (63H1), closed service valve, faulty PCB (63H1 Circuit)
E41	Off	Flashing	1x	Flashing	2 or 6x	Power Transistor overheat	Short circuit of air flow, faulty Inverter PCB
E42	Off	Flashing	1x	Flashing	1 or 5x	Current Cut	Closed service valve, faulty outdoor control PCB
E45	Off	Flashing	1x	Flashing	Flashing	Communication Error - Inverter to Control PCB	Poor Connection, faulty control or inverter PCBs
E47	Off	Flashing	1x	Flashing	7x	Control PCB, Power transistor	Anomalous inverter over voltage
E48	Off	Flashing	1x	Flashing	Flashing	Condenser fan motor	Faulty fan motor or outdoor PCB
E49	Off	Flashing	1x	Flashing	Flashing	Low Pressure Error	Closed service valve, short of gas, faulty LP sensor, faulty outdoor control PCB
E51	Off	Flashing	1x	Flashing	2 or 6x	Inverter Error	Faulty Inverter PCB
E53	Off	Flashing	1x	Flashing	Flashing	Suction pipe thermistor	Poor connection, broken wire, faulty thermistor, faulty PCB
E54	Off	Flashing	1x	Flashing	Flashing	Low Pressure Sensor Error	Closed service valve, short of gas, faulty LP sensor, faulty outdoor control PCB
E55	Off	Flashing	1x	Flashing	Flashing	Under-dome temp thermistor	Poor connection, broken wire, faulty thermistor, faulty PCB
E57	Off	Flashing	1x	Flashing	Flashing	Low Pressure Error	Insufficient refrigerant
E59	Off	Flashing	5x	Flashing	Off or 4x	Compressor start up error	Faulty power supply, faulty inverter circuit.
E60	Off	Flashing	1x	Flashing	-	Compressor	Faulty compressor, faulty inverter circuit.
E75	Off	Flashing	Off	Flashing	-	Central Controller communication error	Poor connection, broken wire, faulty controller

Master/ Slave and Group Settings

Master / Slave Settings

All split system indoor units are supplied set up as a master unit as default and this only needs changing when the system being installed is a multi-split system, excluding SCM or KX systems, comprising of 2 to 4 RAC or PAC indoor units running off a PAC single split outdoor unit. The remote control wires and all wires of the interconnecting cable go to each indoor unit including the slave units.



When using RAC SRK indoor units, excluding ZMP/ZSP models, on a multi-split each indoor unit needs an SC-BIKN-E interface to allow the installation of the wired remote control and setup of the master slave settings.

SYSTEM TYPE				Master/Slave Unit	PAC Indoor Units SW5-1	PAC Indoor Units SW5-2	SC-BIKN-E Interface SW3-1	SC-BIKN-E Interface SW3-2
Single	Twin	Triple	Quad	MASTER	OFF	OFF	OFF	OFF
	Twin	Triple	Quad	SLAVE 1	OFF	ON	OFF	ON
		Triple	Quad	SLAVE 2	ON	OFF	ON	OFF
			Quad	SLAVE 3	ON	ON	ON	ON

All indoor units on a multi-split system must be in the same space and operate off a single wired remote control as there is no refrigerant control in the indoor units.

Group Settings

When multiple systems need to be controlled off a single RC-EX1A, RC-EX3(A) or RC-E5 wired remote control each system needs to be given a different address. The system addressing is set on PAC unit indoor boards using SW2 or on RAC indoor units via SW1 on the SC-BIKN-E interface. Up to 16 indoor units can be connected to a wired remote, including multi-split systems incorporating PAC outdoor units.

System	Indoor Unit	Outdoor Unit	System Type	Master/ Slave Unit	Group Address Switch Setting		Master / Slave Switch	#1	#2
1	FDT	FDC	Split	Master	SW2	0	SW5	OFF	OFF
2	FDT	FDC	Quad	Master	SW2	1	SW5	OFF	OFF
	FDT			Slave 1	SW2	1	SW5	OFF	ON
	FDT			Slave 2	SW2	1	SW5	ON	OFF
	FDT			Slave 3	SW2	1	SW5	ON	ON
3	SRK	FDC	Twin	Master	SW1	2	SW3	OFF	OFF
	SRK			Slave 1	SW1	2	SW3	OFF	ON
4	FDUM	FDC	Split	Master	SW2	3	SW5	OFF	OFF

E03 / E05 ERROR

These errors relate to the communications between the indoor unit and the outdoor unit. The errors could be due to
Incorrect address settings on indoor unit
Broken interconnecting cabling
Power Issue
Pump down initiated
faulty outdoor unit fan motor
faulty Electronic Expansion Valve (EEV)
Blown Fuse
Faulty PCB.

Note: figures in brackets ( ) relate to SC-BIKN2-E interface

1. Check indoor unit SW2 (SW1) and SW5 (SW3) switch settings.
   If the unit is alone on the remote control it is a master unit so SW5-1 (SW3-1) and SW5-2 (SW3-2) should both be OFF.

   If there are multiple SYSTEMS connected to the remote then make sure EACH SYSTEM has a UNIQUE address selected on SW2 (SW1).
   (See previous page “Master/Slave and Group Settings”.

2. Is the RED LED flashing on any of the connected indoor units PCBs?
   If a unit has its Red led flashing three times then that unit is a SLAVE that cannot find its MASTER indoor unit (unit with both SW5(SW3) switches 1 and 2 both OFF and the same SW2(SW1) rotary switch setting (number).

3. Check the VOLTAGE between terminals

1 to Earth	230Vac
2 to Earth	0-5Vac
1 to 2	230Vac

   If a condensate pump is connected across 1 and 2 remove it. External condensate pumps should be independently supplied.
   If the voltage between terminal 2 and Earth is greater than 5V check the neutral (2) connections in the isolator and outdoor units.

4. Check the VOLTAGE DC between

3 to Earth	FDC: 24Vdc or SRK: 16Vdc
2 to 3	FDC: 2 to 20Vdc fluctuating
	SRK: 2 to 16Vdc fluctuating

   If the voltage (Vdc) is 0V then the interconnecting cable is open circuit, ensure that the wire 3 has not been put through an external condensate pumps high water cutoff, OR the outdoor unit has a fault
   If the voltage is steady 24Vdc (16Vdc on SRC) there is a connection fault on the indoor unit or the indoor unit PCB is faulty.
   If the voltage does not get down to 2.0Vdc or achieve 20Vdc (16Vdc on SRC) then there is interference in the cable so check the wire terminations.

5. On the outdoor unit terminal block check the VOLTAGE DC between

3 to Earth	FDC: 24Vdc or SRK: 16Vdc
2 to 3	FDC: 2 to 20Vdc fluctuating
	SRK: 2 to 16Vdc fluctuating

   If the voltage (Vdc) is 24Vdc then the interconnecting cable is open circuit OR the indoor unit has a fault.
   If the voltage is steady is 0V with wire 3 disconnected then the outdoor unit PCB has a problem.
   If the voltage does not get down to 2.0Vdc or achieve 20Vdc (16Vdc on SRC) then there is interference in the cable so check the wire terminations.

   Check the LEDs on the outdoor unit PCB
   The GREEN LED should be permanently flashing while the RED LED is OFF.

   If the GREEN LED is not flashing then check the power supply (CNW) and fuses on the PCB. If the power and fuses are OK, wait a minute after switching the mains OFF to the unit, then disconnect the fan motors (CNFAN1 & 2) and expansion valves (CNEEV1 and 2). Restore power and recheck the Green LEDs state. If the LED starts flashing replace the fan motors and EEVs one at a time to identify the faulty item (See “TEST PROCEDURE – ELECTROBNIC EXPANSION VALVE” and “DC FAN MOTOR TESTING”.

   If the Green LED does not start flashing replace the PCB.

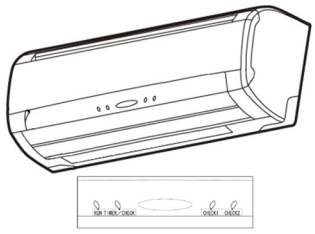
   If the Green LED is flashing continuously and the RED LED is flashing TWICE there is a problem with the connection of the interconnecting cables (See 4. above).

KX SELF-DIAGNOSIS INFORMATION

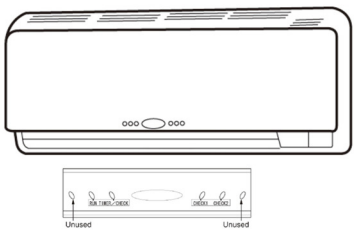
KX High Wall Indoor Units on Wireless Remote Control

When fitted with the wireless remote control kit the high wall units do not show the error code on an digital readout. The error code is indicated in the following manner.

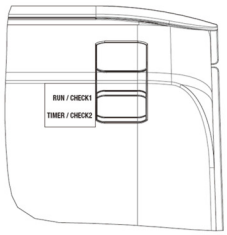
FDK15-56KXE6



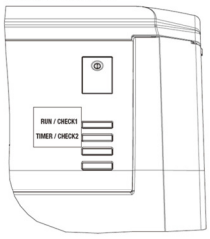
FDK71KXE6



FDK15-56KXZE1



FDK71-90KXZE1



The 'TIMER/CHECK' LED on the KX6 indoor units will flash continously to indicate there is a fault.
On both the KX6 and the KXZE1 high wall units the actual error code is indicated by the number of flashes (0.5s on/0.5s off) in a 10 second period of the 'CHECK1' / 'RUN/CHECK1' (tens) and the 'CHECK2' / 'TIMER / CHECK2' (ones) LEDs.
ie An E39 High Discharge fault would be indicated as follows

KX6	KXZE1	10 sec. per cycle	Flash Rate On	Flash Rate Off
CHECK1 (Orange	RUN/CHECK1 (Green)	1 2 3	0.5s	0.5s
CHECK2 (Orange)	TIMER/CHECK2 (Orange)	1 2 3 4 5 6 7 8 9	0.5s	0.5s

KX SELF-DIAGNOSIS INFORMATION							
Inverter KX		LED Display				FDCA----HKXE4_HXKRE4. FDC----KXEN6, KXE6, KXRE6, KXZE1, KXZPE1, KXZRE1	
		Indoor PCB		Outdoor PCB			
Error Code	O/D 7 segment display	Green	Red	Green	Red	Location of Trouble	Probable Causes
E1		keeps flashing	stays off	keeps flashing	stays off	Communication error (indoor-remote control)	Poor or wrong connection, broken wire, intrusion of noise, faulty indoor PCB or remote control
E2		keeps flashing	keeps flashing	keeps flashing	stays off	Duplicated indoor unit address	Number of connected indoor units exceeds the limitation, duplicated indoor unit address, indoor control PWB anomaly.
E3		keeps flashing	2x or stays off	keeps flashing	stays off	Outdoor unit signal line error	Power not supplied to the O/D unit, mismatch of pairing between I/D and O/D units, indoor control PWB anomaly, Outdoor control PWB anomaly, Missing local wiring.
E5		keeps flashing	2xor stays off	keeps flashing	2x	Communication error during operation	Unit address number setting error, remote control wires broken, poor connection/disconnection of remote control wires, indoor control PWB anomaly
E6		keeps flashing	1 x	keeps flashing	stays off	Indoor heat exchanger thermistor (THI-R1, R2 or R3) anomaly	Anomalous connection of I/D heat exchanger temperature thermistor, I/D heat exchanger thermistor anomaly, I/D control PWB anomaly
E7		keeps flashing	1x	keeps flashing	stays off	Indoor return air temperature thermistor (THI-A) anomaly	Anomalous connection of I/D return air temperature thermistor, I/D return air thermistor anomaly, I/D control PWB anomaly
E9		keeps flashing	1x	keeps flashing	stays off	Drainage trouble	I/D control PWB anomaly, Mistake in setting of float switch, mistake in setting of optional equipment, mistake in drain piping, drain motor anomaly, disconnection/breakage of drain motor wires, CnI float switch connection fault
E10		keeps flashing	stays off	keeps flashing	stays off	More than 16 indoor units connected to a single remote control	Excessiv e number of I/D units, remote control anomaly
E11		keeps flashing	stays off	keeps flashing	stays off	Address setting error between master and slav e indoor units	IU address has been set using the "Master IU address set" function of remote control
E12		keeps flashing	keeps flashing	keeps flashing	stays off	Address setting error by mixed setting method	Automatic address setting and manual address setting method are mixed when setting address of indoor units
E15		keeps flashing	1x	keeps flashing	stays off	EEVKIT supply air temperature thermistor (THI-AF anomaly..	Anomalous connection of I/D supply air temperature thermistor, I/D rsupply air thermistor anomaly, I/D control PWB anomaly
E16		keeps flashing	1x	keeps flashing	stays off	Indoor fan motor anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDK, FDUT71, FDFW series)	I/D fan motor anomaly, foreign matter at rotational area of fan propeller, fan motor anomaly, dust on control PWB, blown fuse, external noise, surge
E18		keeps flashing	1x	keeps flashing	stays off	Address setting error of master and slav e indoor units	Address setting error of the master indoor unit, no power to the master indoor unit, no connection of super link signal wires between master and slav e indoor unit

KX SELF-DIAGNOSIS INFORMATION

Inverter KX		LED Display				FDCA----HKXE4_HXKRE4. FDC----KXEN6, KXE6, KXRE6, KXZE1, KXZPE1	
		Indoor PCB		Outdoor PCB			
Error Code	O/D 7 segment display	Green	Red	Green	Red	Location of Trouble	Probable Causes
E19		keeps flashing	1x	keeps flashing	stays off	Indoor unit operation check or drain motor check mode anomaly	Mistake in SW7-1 setting due to forgetting to turn off SW7-1 after indoor operation check
E20		keeps flashing	1x	keeps flashing	stays off	Indoor fan motor speed anomaly (FDT, FDTC, FDTW, FDTS, FDU, FDUM, FDK, FDUT71, FDFW series)	I/D fan motor anomaly, foreign matter at rotational area of fan propeller, fan motor anomaly, dust on control PWB, blown fuse, external noise, surge
E21		keeps flashing	1x	keeps flashing	stays off	Defectiv e panel switch operation (FDT)	Defectiv e panel switch, disconnection of wiring, defectiv e I/D control PWB
E22		keeps flashing	2x	keeps flashing	stays off	Wrong connection with Outdoor unit	Unmatched pairing of 1.5kW KX indoor and KX6 /KXR6 outdoor unit, Indoor control PCB anomaly, Outdoor control PCB anomaly
E28		keeps flashing	stays off	keeps flashing	stays off	Remote control temperature thermistor anomaly (Thc)	Anomalous connection of remote control temperature thermistor, remote control temperature thermistor anomaly, remote control PWB anomaly
E30		keeps flashing	stays off	keeps flashing	1x	Unmatched connection of indoor and outdoor unit	Indoor control PCB anomaly, Outdoor control PCB anomaly
E31		keeps flashing	stays off	keeps flashing	1x	Duplicated outdoor unit address number	Mistake in address setting of outdoor units, more than 129 I/D units connected, no setting of master/slav e setting switch for combination use
E32		keeps flashing	stays off	keeps flashing	2x	Open L3 phase on power supply at primary side or incorrect phase rota	Anomalous power supply at primary side, outdoor control PWB anomaly, Incorrect power supply phase rotation
E36	E36-1	keeps flashing	stays off	keeps flashing	1x	Discharge pipe temperature error, Tho-D1	Discharge pipe temperature anomaly, SV1,2 anomaly, breakage in coil, faulty main body, O/D control PWB anomaly, insufficient amount of refrigerant, insufficient airflow v olume, short circuit of airflow
	E36-2	keeps flashing	stays off	keeps flashing	2x	Discharge pipe temperature error, Tho-D2	
	E36-3	keeps flashing	stays off	keeps flashing	3x	Liquid flooding anomaly	KX6 product only
E37	E37-1	keeps flashing	stays off	keeps flashing	1x	Outdoor heat exchanger temperature thermistor anomaly, Tho-R1	Broken thermistor harness or the internal wire of sensing section, disconnection of thermistor harness connection, O/D control PWB anomaly
	E37-2	keeps flashing	stays off	keeps flashing	2x	Outdoor heat exchanger temperature thermistor anomaly, Tho-R2	
	E37-3	keeps flashing	stays off	keeps flashing	3x	Outdoor heat exchanger temperature thermistor anomaly, Tho-R3	
	E37-4	keeps flashing	stays off	keeps flashing	4x	Outdoor heat exchanger temperature thermistor anomaly, Tho-R4	
	E37-5	keeps flashing	stays off	keeps flashing	5x	Outdoor sub cooling coil temperature thermistor 1 anomaly, Tho-SC	
	E37-6	keeps flashing	stays off	keeps flashing	6x	Outdoor sub cooling coil temperature thermistor 2 anomaly, Tho-H	
E38		keeps flashing	stays off	keeps flashing	1x	Outdoor air temperature thermistor anomaly, Tho-A	
E39	E39-1	keeps flashing	stays off	keeps flashing	1x	Discharge pipe temperature thermistor anomaly, Tho-D1	
	E39-2	keeps flashing	stays off	keeps flashing	2x	Discharge pipe temperature thermistor anomaly, Tho-D2	
E40		keeps flashing	stays off	keeps flashing	1x	High Pressure anomaly, 63H1-1, 2 activ ated	Short circuit of airflow at condenser side of heat exchanger/disturbance of airflow/cloged filter /fan motor anomaly, disconnection of high pressure (HP) switch connector, breakage of HP switch harness, closed serv ice v alv es, HP sensor (PSH) anomaly, HP switch anomaly
E41	E41-1	keeps flashing	stays off	keeps flashing	1x	Power transistor ov erheat, CM1	Anomalous high temperature of power transistor is detected 5 times within 60 minutes. Power transistor anomaly, power transistor temperature thermistor anomaly, inv erter PWB anomaly, outdoor fan motor anomaly, anomalous cooling fan motor for inv erter
	E41-2	keeps flashing	stays off	keeps flashing	2x	Power transistor ov erheat, CM2	

KX SELF-DIAGNOSIS INFORMATION

Inverter KX		LED Display				FDCA----HKXE4_HXKRE4. FDC----KXEN6, KXE6, KXRE6, KXZE1, KXZPE1, KXZRE1	
		Indoor PCB		Outdoor PCB			
Error Code	O/D 7 segment display	Green	Red	Green	Red	Location of Trouble	Probable Causes
E42	E42-1	keeps flashing	stays off	keeps flashing	1x	Current cut, CM1	Compressor anomaly, refrigerant leak, power transistor module anomaly, anomalous power supply for INV PWB, O/D fan motor anomaly
	E42-2	keeps flashing	stays off	keeps flashing	2x	Current cut, CM2	
E43	E43-1	keeps flashing	stays off	keeps flashing	1x	Excessive number of indoor units connected	Mistake in setting of I/D or O/D addresses, mistake in signal wire connection
	E43-2	keeps flashing	stays off	keeps flashing	2x	Excessive total capacity of connection	
E44	E44-1	keeps flashing	stays off	keeps flashing	1x	Liquid flooding anomaly, CM1	KXZ Product only. Mismatching of refrigerant piping and or signal wiring, overcharging of refrigerant, anomalous control of superheat, anomalous circuit of liquid refrigerant by-pass, anomalous refrigerant circuit of sub cooling coil, under dome temperature Tho-D1, D2 anomaly
	E44-2	keeps flashing	stays off	keeps flashing	2x	Liquid flooding anomaly, CM2	
E45	E45-1	keeps flashing	stays off	keeps flashing	1x	Communication error between inverter PWB and outdoor control PWB, INV 1	Signal wire anomaly, O/D control PWB anomaly, INV PWB anomaly, inrush current prevention resistor anomaly, defective 52C or 52X, defective diode module
	E45-2	keeps flashing	stays off	keeps flashing	2x	Communication error between inverter PWB and outdoor control PWB, INV 2	
E46		keeps flashing	stays off	keeps flashing	stays off	Mixed address setting methods coexist in the same network	Mistake in the address setting, mistake in the connection of signal wire
E48	E48-1	keeps flashing	stays off	keeps flashing	1x	Outdoor DC fan motor anomaly, FMO1	Broken or disconnected wire, faulty fan motor, defective inverter PWB, defective control PWB, defective power transistor, defective diode module, defective surge suppressor resistor
	E48-2	keeps flashing	stays off	keeps flashing	2x	Outdoor DC fan motor anomaly, FMO2	
E49		keeps flashing	stays off	keeps flashing	1x	Low pressure anomaly	Low pressure sensor (PSL) anomaly, service valves closed, EEV anomaly, insufficient refrigerant amount, clogging at EEV or strainer
E51	E51-1	keeps flashing	stays off	keeps flashing	1x	Power transistor overheat, CM1	Anomalous high temperature of power transistor is detected 15 minutes continuously. Broken thermistor harness or the internal wire of sensing section, disconnection of thermistor harness connection, O/D control PWB anomaly
	E51-2	keeps flashing	stays off	keeps flashing	2x	Power transistor overheat, CM2	
E53	E53-1	keeps flashing	stays off	keeps flashing	1x	Suction pipe temperature thermistor anomaly, Tho-S, CM1	Broken thermistor harness or the internal wire of sensing section, disconnection of thermistor harness connection, O/D control PWB anomaly
	E53-2	keeps flashing	stays off	keeps flashing	2x	Suction pipe temperaturethermistor anomaly, Tho-S, CM2	
E54	E54-1	keeps flashing	stays off	keeps flashing	1x	Low pressure anomaly (PSL)	Broken sensor harness, disconnection of sensor harness connection, sensor (PSH, PSL) anomaly, O/D control PWB anomaly, anomalous installation conditions, insufficient airflow volume, excessive or insufficient refrigerant amount
	E54-2	keeps flashing	stays off	keeps flashing	2x	High pressure anomaly (PSH)	
E55	E55-1	keeps flashing	stays off	keeps flashing	1x	Under dome temperature thermistor anomaly, Tho-C1	Broken thermistor harness or the internal wire of sensing section, disconnection of thermistor harness connection, O/D control PWB anomaly
	E55-2	keeps flashing	stays off	keeps flashing	2x	Under dome temperature thermistor anomaly, Tho-C2	
E56	E56-1	keeps flashing	stays off	keeps flashing	1x	Power transistor temperature anomaly, Tho- P1	Broken thermistor harness or the internal wire of sensing section, disconnection of thermistor harness connection, O/D control PWB anomaly
	E56-2	keeps flashing	stays off	keeps flashing	2x	Power transistor temperature anomaly, Tho- P2	
E58	E58-1	keeps flashing	stays off	keeps flashing	1x	Anomalous compressor by loss of synchronism, CM1	Insufficient time elapsed after the power supplied before compressor start up (unit started without crankcase heater ON), compressor anomaly, inverter PWB anomaly, power transistor anomaly
	E58-2	keeps flashing	stays off	keeps flashing	2x	Anomalous compressor by loss of synchronism, CM2	
E59	E59-1	keeps flashing	stays off	keeps flashing	1x	Compressor start up failure, CM1	Anomalous voltage of power supply, anomalous components for refrigerant circuit, inverter PWB anomaly, loose connection of connector or cable, compressor anomaly (motor or bearing)
	E59-2	keeps flashing	stays off	keeps flashing	2x	Compressor start up failure, CM2	

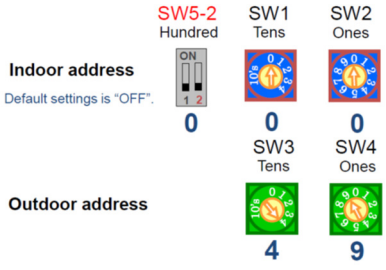
KX SELF-DIAGNOSIS INFORMATION							
Inverter KX		LED Display				FDCA----HKXE4_HXKRE4. FDC----KXEN6, KXE6, KXRE6, KXZE1, KXZPE1, KXZRE1	
		Indoor PCB		Outdoor PCB			
Error Code	O/D 7 segment display	Green	Red	Green	Red	Location of Trouble	Probable Causes
E60	E60-1	Keeps flashing	Stays off	Keeps flashing	1x	Rotor position detection error, CM1	KX4 & KX6 Product. If it fails to detect the rotor position of compressor, after changing over to the operation of compressor rotor position detection, the compressor stops. It restarts automatically after 3 minutes delay. If this anomaly occurs 4 times within 15 minutes after the initial detection, error is displayed
	E60-2	Keeps flashing	Stays off	Keeps flashing	2x	Rotor position detection error, CM2	
E61	E61-1	keeps flashing	stays off	keeps flashing	1x	Communication error between the master unit and slave units, Slave unit 1	Signal wire anomaly, O/D control PWB anomaly, INV PWB anomaly, inrush current prevention resistor anomaly
	E61-2	keeps flashing	stays off	keeps flashing	2x	Communication error between the master unit and slave units, Slave unit 2	
E63		keeps flashing	stays off	keeps flashing	1x	Emergency stop. When an ON signal is inputted to the CNT terminal of I/D control PWB	Factor for emergency stop
E75		keeps flashing	stays off	keeps flashing	stays off	Central control communications error	Poor connection, broken wire, faulty controller
E85		keeps flashing	stays off	keeps flashing	stays off	Indoor unit PCB setting error	The indoor PCB has been replaced but the links/switches on the replacement have not been configured the same as on the original PCB, specifically SW8-3/J7 which is currently open/off and needs to be closed/on.
-	OPE 3	keeps flashing	stays off	keeps flashing	stays off	Master/Slave Outdoor Unit Control Switch Error	Invalid combination of outdoor units
-	OPE 7	keeps flashing	stays off	keeps flashing	stays off	SW4 Setting incorrect	Correct the SW4 settings to match the outdoor unit model.
-	OPE 10	keeps flashing	stays off	keeps flashing	stays off	SW5 setting (Test Run or Pump down) in slave outdoor unit	Reset the SW5 switchs as the required function can only be initiated in the master outdoor unit

KX SYSTEM ADDRESSING INFORMATION

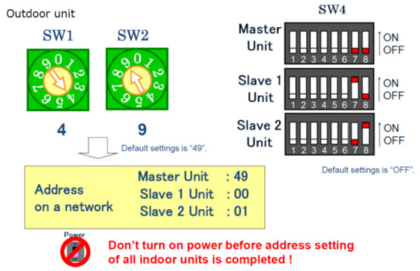
KX systems comprises a number of indoor units connected to up to three connected outdoor units and communicate using MHI's proprietary Superlink network which also provides network communications to a Central Controller. Several systems can connect to the same network so it is important to ensure that the addressing is correct. To facilitate this a systems Superlink (S/L) communications (A/B daisy-chain through the connected indoor units) should be connected to the outdoor units A1/B1 terminals whilst inter system / central control wiring should be connected to A2/B2. This allows systems to be disconnected from the inter system/central control network for easier commissioning.

Individual systems can auto address as standard by turning the power on to the outdoor unit first then switching on power to individual indoor units allowing a second between them.

Indoor Unit



Outdoor Unit



Installations with a Central Controller or multiple systems installed should be manually addressed as follows:
Do not turn on the power to the indoor or outdoor units until the indoor unit addressing has been completed.

The two **green** rotary switches (SW1 & SW2) on the outdoor unit should be set to a unique outdoor unit address (new S/L [KX6/KXZ]: 0~31, old S/L: 0~47) and the two (SW3 & SW4) on the indoor unit PCB should match those on the control PCB of the master outdoor unit piped to them.

Where there are multiple outdoor units piped together they must all be set the same on the **green** SW1 & SW2 rotary switches and be set as master (Both OFF) or slave units using the SW4-7 and SW4-8 dip switches. (When addressing systems allow for slave units, which have the master address +1 or +2 so System 0 with 3 outdoor units would use addresses 0, 1 and 2 therefore the next available system address is 4).

The indoor unit **blue** rotary switches (SW1 & SW2) and SW5-2 are used to give the unit a unique individual address (new S/L [KX6/KXZ]: 0~127, old S/L: 0~47) on the Superlink network.

Note: as KX outdoor units have a 6 Hour compressor crankcase warm up period on first power switch their Mains on as quickly as possible.

PFD Box Replacement

Compatibility for PFD BOX

Outdoor unit	Indoor unit	PFD BOX	Super link	Compatibility	Remark
KXR4A	KX4	OLD	OLD	OK	
			NEW		
		NEW	OLD	OK	Requires wiring modification
			NEW		
	KX6 / KXZE1	OLD	OLD	OK	
			NEW		
		NEW	OLD	OK	
			NEW		
KXR6	KX4	OLD	OLD	OK	
			NEW		
		NEW	OLD	OK	Requires wiring modification
			NEW		
	KX6 / KXZE1	OLD	OLD	OK	
			NEW		
		NEW	OLD	OK	
			NEW	OK	
KXZR1	KX4	OLD	OLD		
			NEW		
		NEW	OLD		
			NEW		
	KX6 / KXZE1	OLD	OLD		
			NEW		
		NEW	OLD	OK	
			NEW	OK	

OLD PFD BOX = PFD***E, PFD***ER or PFD112X4ER　　NEW PFD BOX = PFD***3E, PFD***4E, PFD1123X4 or PFD1124X4

PFD Box Connection

The PFD boxes are supplied with a Relay box that converts 12Vdc outputs from the indoor units CNT or CNT2 connector into 240V control signals for the solenoid valves. The Relay box and connection are as follows

Flow Selector Box	Relay Box To PFD	Connection
PFD***E	3 Wire	CNT
PFD***ER	4 Wire	CNT
PFD***3E	5 Wire	CNT2
PFD***4E	5 Wire	CNT2

Output from CNT

Signal from Remocon	Status of indoor unit	20S XR2	SVH XR3	SVG NOT XR2 and XR3
Heating	Operation	**ON**	**ON**	OFF
	Thermo off	**ON**	**ON**	OFF
	Stop in heating	**ON**	**ON**	OFF
	Defrost	OFF	OFF	OFF
	Oil return in heating	OFF	**ON**	**ON**
Cooling	Operation	OFF	OFF	OFF
	Thermo off	OFF	OFF	OFF
	Stop in cooling	OFF	OFF	OFF
	Defrost	OFF	OFF	OFF
	Oil return in cooling	OFF	**ON**	**ON**
	In pressure equlization *1	**ON**	OFF	OFF
Stop	Before power on	OFF	OFF	OFF

*1: when operation mode is changed between cooling and heating and oil return

XR1　OPERATION
XR4　ERROR

Output from CNT2

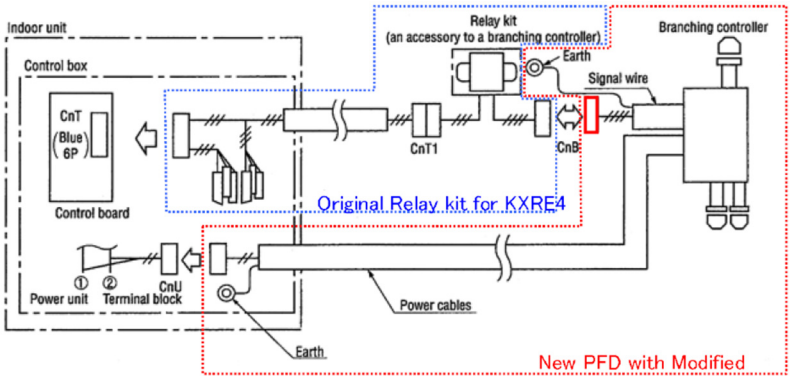
CNT2 Terminal	Controlled SV
CNT2-2:XB1	20S
CNT2-3:XB2	SVH
CNT2-4:XB3	SVG
CNT2-5:XB4	SVE

Status of indoor unit	XB1 20S	XB2 SVH	XB3 SVG	XB4 SVE
Cooling/Stop/Defrost	OFF	OFF	OFF	OFF
Heating	**ON**	**ON**	OFF	OFF
Oil return	OFF	**ON**	**ON**	OFF
Cooling to Heating	**ON**	OFF	OFF	OFF
Heating to Cooling	**ON**	OFF	OFF	**ON**

Applying New PFD box to KXRE4 Systems

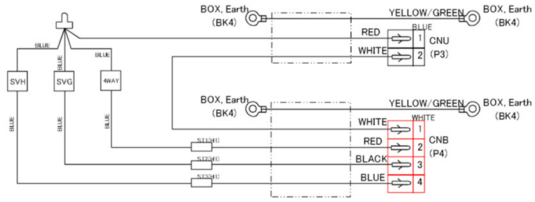
These instructions also apply when replacing existing PFD boxes with PFD*4E PFD Boxes**

When replacing a PFD***E or PFD***ER branch control box on a KXRE4 system with the newer style PFD boxes the wiring needs modifying as KX4 indoor units do not have the CNT2 connection only CNT so the new relay box is incompatible. It is therefore imperative that the existing relay box is in good condition AND is of the 4 wire type as it will need to be re-used. If the branch control box is a PFD***E it will have the 3 wire relay box which will need to be replaced with the 4 wire relay box (HRP Code: 631085).

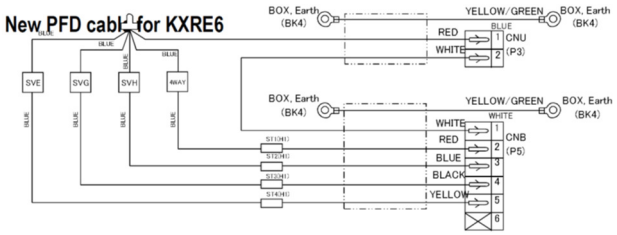


The new PFD box being installed comes with a relay box which needs to be discarded as it is incompatible with the indoor unit. The interconnecting cable from the PFD box to the relay box will also require modification as their plugs will be different due to the different number of cables used.

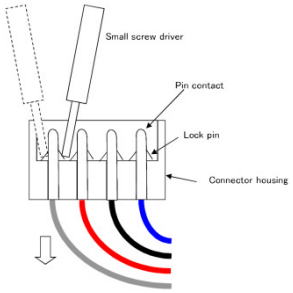
Original PFD cable for KXRE4



New PFD cable for KXRE6



The recommendation is to remove the plug from the new PFD boxes cable and replace it with the plug from the original PFD box modifying the wire arrangement to suit and insulating the unused Yellow wire.



To remove the plug use a small screwdriver to push the lock pin while pulling the wire.

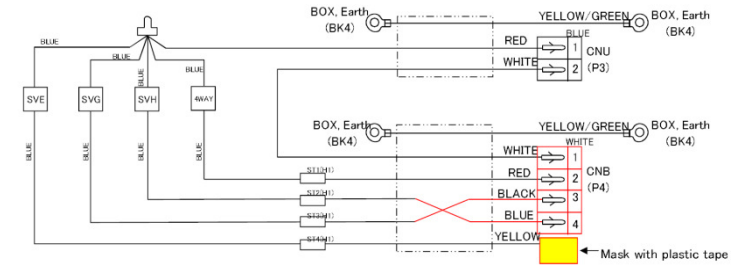
Keep pulling the wire while pushing the second lock pin until the pin pulls out of the connector housing.

Remove all the pins from the connector housing.

Remove the housing from the wiring looms of both the original PFD box and the new box.

Discard the housing from the new PFD box and insert the pins of the new PFD boxes wiring loom into the connector housing from the original PFD box as follows

Modified New PFD cable for KXRE4

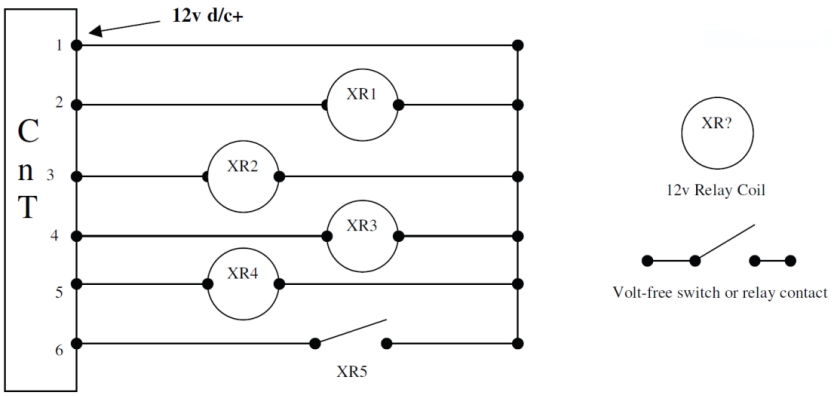


When completed the wiring colours should end up as follows

PFD Box	Pin	Relay Box
White	1	White
Red	2	Red
Black	3	Black
Blue	4	Blue
Yellow	-	Not Connected

CNT 6 Wire Adaptor

For remotely starting, stopping and monitoring the unit state.



635566 6-Wire Adapter Kit for MHI Indoor Units.

Installation Guide.

This kit provides the wiring connection to the indoor unit printed circuit board (PCB) or an SC-BIKN-E interface to allow remote start/stop control and basic status monitoring.

Fitting the CnT connector.

Isolate power supply to the indoor unit.
Remove indoor unit electrical panel cover (FD models) or SC-BIKN-E interface cover (SR models).
Locate the **blue** socket marked CnT on the exposed P.C.B.
Plug the 635566 wiring harness into the CnT socket.
Run the cables so that the terminal block is located in a convenient position outside the control panel.

Connecting Remote Start/Stop, Shown as XR5 on the Diagram

The unit can be controlled by a volt free switch or relay contact (default). If the unit is left in its factory set condition the unit will operate as follows:-

When the volt free contact closes between terminal 1 (Red) & 6 (Orange) the unit will start, regardless of whether it was running or not, (if the unit was already running, it will continue to run).
When the contact opens the unit will stop, regardless of whether it was running or not prior to the switch opening.

Remote Indication Relays.

The relays must have 12Volt D.C. coils. The contacts must be rated for the application for which they are being used. For typical low current switching the following relay may be suitable:-

Supplier: RS Components.
Relay Part. No.: 121-8074

The unit will provide the following outputs:-
Indoor unit operating / Heating mode (not on cooling only units) / Compressor on / Common alarm.

One relay is required for each output.

Determine the number of relays that are required and mount them in a suitable location, as close to the unit as is practical (max. 1.5m).

Link all the positive terminals (A1) of the relay/s together and connect to terminal 1 (Red) on the CnT connection.
Connect the negative terminals (A2) of the relays to the terminal you require.

The terminal functions are as follows:

Indoor unit operating:	Connect to the wire no. 2 (**Black**)	Shown as XR1 on the Diagram.
Heating mode:	Connect to the wire no. 3 (**Yellow**)	Shown as XR2 on the Diagram.
Compressor run:	Connect to the wire no. 4 (**Blue**)	Shown as XR3 on the Diagram.
Common Alarm:	Connect to the wire no. 5 (**Brown**)	Shown as XR4 on the Diagram

Changing Operation of the CnT connector, 635566's, On/Off Control.

The On/Off operation characteristics can be changed by either setting Jumper1 and Jumper3 (or SW7-1 and SW7-3 if fitted) on the indoor PCB or via the "IU Function settings" menu on the wired remote control RC-E5, RC-EX1A or RC-EX3. To make the setting via the wired remote control please see the remote control installation instructions.

To configure the ON/Off operation via the indoor unit control PCB, (FD models only) see below.

Normal operation, [Default setting], J1 & J3 are intact. (SW7-1 and SW7-3 both on)
When CnT contact 1 to 6 is closed, operation starts, and when it is open operation stops.
Re-start from the remote controller is allowed.

Pulse operation, when J1 is cut & J3 is intact, (SW7-1 off and SW7-3 on).
Each time CnT contact 1 to 6 is pulsed open/closed/open, the operation changes over, (on to off/off to on).
Re-start from the remote controller is allowed.

Operation prohibited control (A), when J1 is intact & J3 is cut (SW7-1 on and SW7-3 off).
When CnT contact 1 to 6 is open, the unit will stop and re-start from the remote controller is blocked.
When CnT contact 1 to 6 is closed, the unit remains stopped but re-start from remote controller is allowed.

Operation prohibited control (B), J1 & J3 are cut, (SW7-1 and SW7-3 both off).
When CnT contact 1 to 6 is open, the unit will stop and re-start from the remote controller is blocked.
When CnT contact 1 to 6 is closed, the unit will auto restart.

To configure the ON/Off operation via the SC-BIKN-E interface PCB, (SR models only) see below.

Normal operation, [Default setting], SW2-1 and SW2-3 both on.
When CnT contact 1 to 6 is closed, operation starts, and when it is open operation stops.
Re-start from the remote controller is allowed.

Pulse operation, when SW2-1 off and SW2-3 on.
Each time CnT contact 1 to 6 is pulsed open/closed/open, the operation changes over (on to off/off to on).
Re-start from the remote controller is allowed.

Operation prohibited control (A), when SW2-1 on and SW2-3 off.
When CnT contact 1 to 6 is open, the unit will stop and re-start from the remote controller is blocked.
When CnT contact 1 to 6 is closed, the unit remains stopped but re-start from remote controller is allowed.

Operation prohibited control (B), SW2-1 and SW2-3 both off.
When CnT contact 1 to 6 is open, the unit will stop and re-start from the remote controller is blocked.
When CnT contact 1 to 6 is closed, the unit will auto restart.

KX4, KX6 and KXZE1 Outdoor Unit Service Switch Settings

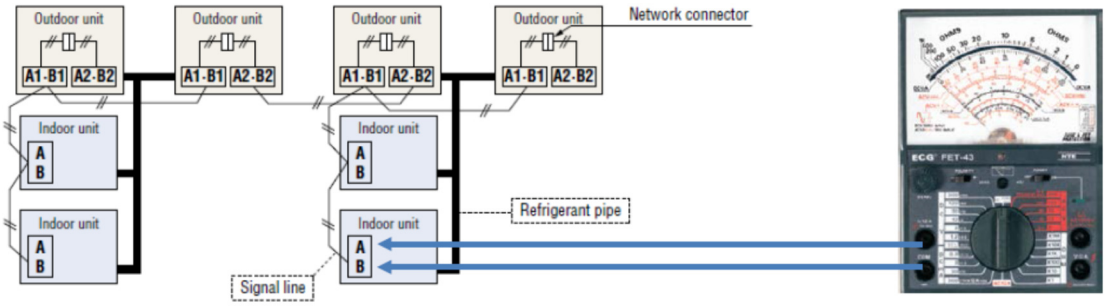
Enable Backup Operation (Max 24Hrs Operation)	Power OFF the outdoor unit Switch SW3-2 ON Power UP the outdoor unit
Enable Test Run in Heating Mode	SW5-2 OFF then SW5-1 ON
Enable Test Run in Cooling Mode	SW5-2 ON then SW5-1 ON
Enable Pump Down Operation (Ends after 15mins or LP < 0.1MPa)	Switch OFF all indoor units Shut outdoor unit Liquid and Discharge Service valves Switch SW5-3 ON, SW5-2 On then SW5-1 ON

KX Communications Wiring (A/B) Check

The Superlink, A/B, communications wiring can be checked using an Ohm Meter or Multi-Meter.

It is best to do this test on each individual VRF system prior to connection to a central control network and to the whole central control network once all systems are installed and commissioned.

Once the installation has been completed and with all units connected to the same Superlink (A/B) network, (Indoor units, Outdoor units and Central Controllers), powered OFF check the resistance, at the outdoor unit and furthest indoor unit, across A and B terminals in Ohms.



If there are more than one system on the site check each system individually. Once all systems are individually checked then check the whole A/B network.

The result should be within 10% of the following calculations result

	INDOOR UNITS		Central Controls		Outdoor Units		Network Resistance
	KX4	KX6/KXZE1	Non N Type	N Type	KX4	KX6/KXZE1	
46000 / ((		x5) + (		x9) + (		x5) + (		x9)) =	Ω

Be careful as the A/B network is only 5Vdc

If the result above is ≤ 100Ω then split the Superlink network in 2 or more sections for checking.

If the resistance measured is less than 100Ω check the A/B cable isn't connected to a mains cable or connected to the remote control X/Y terminals on an indoor unit.

With no cables connected the resistance of the X/Y terminals on the indoor and outdoor unit PCBs is 4Ω to 5Ω.

Compressor Windings Resistances

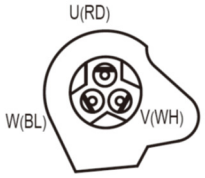
Testing Method

1) Setup Procedure
   a) Turn off the power to the system.

   b) Allow the compressor to cool (if it was greater than 30℃)

   c) Remove the terminal cover from the compressor and disconnect the wires U, V and W.

   d) With your multi-meter set for Ohms (Ω) check the resistances U-V, V-W, U-W.



Position of compressor terminals

   e) Check the values obtained against the figures in the following lists for the relevant unit / compressor model.

   f) Using a Mega meter or the mega Ohms (MΩ) setting on your multi-meter test the resistance of each compressor terminal to Earth, either on an unpainted part of the compressor body, to the condensing unit chassis or to an earth terminal in the electrics box.
   If you do not have a Mega meter set your multi-meter to the highest resistance setting available to do the test.
   The reading should be greater than 1MΩ on a Mega meter or infinity on a multi meter.

2) Diagnosis
   If the any of the terminal to terminal readings read infinity or over range then you have an open circuit winding.

   If any of the terminal to terminal readings are less than 0.1Ω then you have a short circuit in the compressor windings or water in the compressor oil.

   If the reading between the compressor terminal and earth is low, ie measured in Ohms, then the compressor windings are down to earth

   If the reading to earth is not 0Ω or is less than 1 MΩ (or infinity on a multi meter) then you could have moisture in the system so repeat test f) after running the system for 5-10 minutes. Do not wait for the compressor to cool down for this second test.

RAC Models	Compressor	Resistance(ohms)		
		U-V	U-W	V-W
SRC20HG	2RS127D5AA04	4.023		
SRC28HG	2PS146D5BC04	3.941		
SRC40HG-1	RM5515ENE7	6.058	3.899	2.159
SRC52HE-2	RM5522GNE4	3.927	2.323	1.604
SRC63HE-2	RM5526GNE4	4.122	2.775	1.347
SRC71HE-2	2JS386D5AB02	1.135		
SRC20HG-S	RM-B5077MNE	10.878	7.026	3.852
SRC28HG-S	5PS102DAB	7.172	3.309	3.863
SRC40HG-S	5KS150DB	5.735	3.529	2.206
SRC50HE-S1	RM-B5518MNE5	4.136	2.46	1.676
SRC56HE-S1	RM-B5120MNE5	3.927	2.323	1.604
SRC20-35ZJ-S, SRC20-50ZM-S, SRC20-35ZS-S	RM-B5077MDE1	1.703		
SRC50ZM-S, SRC50ZS-S	5RS132XAB21	1.417	1.435	1.392
SRC63-71ZE-S1	TNB220FLBM1	0.88		
SRC63-80ZK-S, SRC63-80ZM-S, SRC60-80ZR-S	RM-T5118MDE2	1.154		
SRC20-25ZS-W	RM-C5077SBE2	4.428		
SRC35ZS-W	RM-B5077SBE2	1.703		
SRC50ZS-W	9RS102XDA21	1.728	1.761	1.705
SRC20-35ZIX-S	RM-B5077MDE1	1.703		
SRC50-60ZHX-S, SRC50-60ZIX-S	5CS130XGB04	0.953		
SRC20-35ZJX-S, SRC20-35ZMX-S	RM-B5077MDE1	1.703		
SRC40-60ZJX-S	5CS130XGB04	0.953		
SRC20-35ZSX-S, SRC20-35ZSX-SA, SRC20-35ZSXH-S	RM-T5111MCE2	1.786		
SRC40-60ZMX-S, SRC40-60ZSX-S	RM-T5113MCE2	0.864		
SRC20-60ZSX-W	RM-T511111SWE3	1.786		
SRC25-35ZJ-SA, SRC20-35ZJP-S, SRC25-35ZJR-S, SRC20-35ZJX-SA, SRC20-35ZMP-S SRC25-35ZSP-S	RM-B5077MDE1	1.703		
SRC45ZMP-S, SRC45ZSP-S	GKT128MFA	1.104		
DXC09-12Z3-S	RM-B5077MDE1	1.703		
DXC18Z3-S	5RS132XAB21	1.417	1.435	1.392
SCM40ZG-S	5RS102X	1.047	1.064	1.029
SCM45-48ZG-S	5CS102XFD	0.642	0.636	0.652
SCM60-80ZG-S	TNB220FLBMT	0.88		
SCM40-50ZJ-S	RM-T5113MDE2	1.619		
SCM60-80ZJ-S, SCM60-80ZM-S,	RM-T5118MDE2	1.154		
SCM100-125ZJ-S, SCM100-125ZM-S	RM-T5126MDE21	0.293		
SCM40-45ZS-S	RM-T5111MFE2	1.703		
SCM50ZS-S	RM-T5113MFE2	1.703		

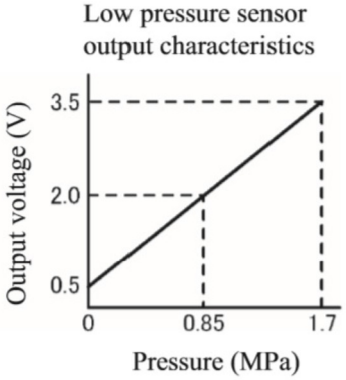
PAC Models	Compressor	Resistance(ohm)
FDCVA151-251HENR	5CS102XFD	0.643
FDCVA302HENR	2YC45DXD	1.014
FDCVA402-602HENAR, FDCVA402-602HESAR	RM-B5125MD11	0.293
FDCVA802-1002HESAR	GT-C5150ND79	0.334
FDC71VN	2YC45DXD	1.014
FDC100-140VN	RM-T5126MDE2	0.293
FDC100-140VNA	RM-T5126MCE3	0.448
FDC100-140VS	RM-T5126MDE3	1.172
FDC100-140VSA	MCE4SWE2	1.414
FDC200-250VS	GT-C5150ND70K	0.334
FDC250VSA	GT-C5150NC40KF	0.309
FDC71VNP	RM-T5113MDE2	1.619
FDC71VNX, FDC90VNP	RM-T5118MDE2	1.154
FDC100VNP	RM-T5126MDE1	1.172
FDC100-140VNX	RM-T5134MDE2	0.293
FDC100-140VSX, FDC200VSA	RM-T5134MDE3	1.172

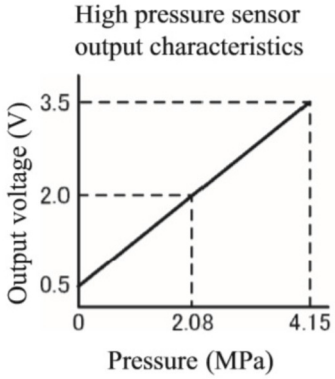
KX Models	Compressor	Resistance(ohm)
FDCA140HKXEN4R	GT-C5139ND50	0.334
FDCA224-335HKXE4R	GT-C5150ND74	0.334
FDCA335HKXE4R-K, FDC400-680HKXE4R	GT-C5150ND78A	0.334
FDC224-335HKXRE4R	GT-C5150ND74	0.334
FDCA335HKXRE4R-K, FDC400-680HKXRE4R	GT-C5150ND78A	0.334
FDCA224-335HKXE4BR	GT-C5150ND78L	0.334
FDCA224-335HKXE4BR	GT-C5150ND75K	0.334
FDCA335HKXE4BR-K, FDC400-680HKXRE4BR	GT-C5150ND78A	0.334
FDCA224-335HKXRE4BR	GT-C5150ND78L	0.334
FDCA224-335HKXRE4BR	GT-C5150ND75K	0.334
FDCA335HKXRE4BR-K, FDC400-680HKXRE4BR	GT-C5150ND78A	0.334
FDC112-155KXEN6	RM-T5126MDE21	0.293
FDC112-155KXES6	RM-T5126MDE31	1.172
FDC224-280KXE6, FDC224-280KXZME1	GT-C5150NH40K	0.691
FDC335KXE6, FDC335KXZME1	GT-C5160NH40K	0.691
FDC335KXE6-K, FDC400-560KXE6	GT-C5150NH48L	0.691
FDC560KXE6-K, FDC615-680KXE6	GT-D5160NH48L	0.691
FDC224-280KXE6M	GT-C5150MG40K	0.183
FDC335KXE6M	GT-D5160MG40K	0.183
FDC335KXE6M-K, FDC400-560KXE6M	GT-C5150MG48L	0.183
FDC560KXE6M-K, FDC615-680KXE6M	GT-D5160MG48L	0.183
FDC224-280KXRE6	AG-T201A727HB	0.691
FDC335KXRE6	AG-T201A767HB	0.691
FDC335KXRE6-K, FDC400-560KXRE6	AG-T201A827HD	0.691
FDC560KXRE6-K, FDC615-680KXRE6	AG-T201A867HD	0.691
FDCB280KXE6, FDCB280KXE6A	GT-C5150NH48L	0.691
FDCB450KXE6	GT-D5160NH48L	0.691
FDCH335KXE6-K FDCH400-560KXE6	GT-C5150NH48L	0.691
FDCH560KXE6—K, FDCH615-680KXE6	GT-D5160NH48L	0.691
FDC224-280KXZPE1	GT-C5150NC40KF	0.309
FDC280-335KXZE1, FDC224KXZRE1-335KXZRE1	GT-C5150NC47LF	0.309
FDC400-450KXZE1, FDC400-450KXZRE1	GU-C5185ND47V	0.264
FDC475-560KXZE1, FDC475-670KXZRE1	GT-C5150NC47LF (X2)	0.309

PSL/PSH Pressure Transducer Outputs

Take voltage readings as below and compare them with the actual pressure readings, measured using refrigerant gauges.

Wiring of Pressure Transducer	Pressure Transducer	
	Low Pressure PSL	High Pressure PSH
5Vdc Supply	Red	Red
Common (Gnd)	Black	Black
Signal / Output Voltage	White	White
Operating Range (Mpa)	0-1.7	0-4.15





Test Procedure – Inverter Checker Compatibility

1. RAC

Model	Type
SRC ZG-S, ZGX-S, SCM ZG-S	A
SCM100~125ZJ-S1	B
SRC40~60ZJX-S, SRC63~80ZK-S SRC20~50ZJ-S/C, SRC25~60ZJX-S/C SRC25~45ZJP-S1, SCM40-80ZJ-S/C	C
SRC40~60ZHX, SRC40~60ZIX-S SRC20~50ZJ-S, SRC25~35ZJX-S SRC25~45ZJP-S, SCM40~80ZJ-S	D

2. PAC

(FDC***VN, VS, VNX, VSX)

Capacity	Type	
	1Ph	3Ph
71VN/VNX	B	
71~100VNP	C	
100, 125, 140	B	B
200, 250		A

2. KX

(FDCA***KXK('R)E4R, FDC***KX('R)E6)

Capacity	Type	
	KX4	KX6
112, 140, 155	A	B
224, 280	A	B
335 ~680	A	B

Unit Settings for Inverter Checker Test	
Type A:	No special settings required
Type B:	Requires dip switch SW10-4 turning ON
Type C:	Connector required to put unit in TEST mode
Type D:	Not compatible with inverter checker.

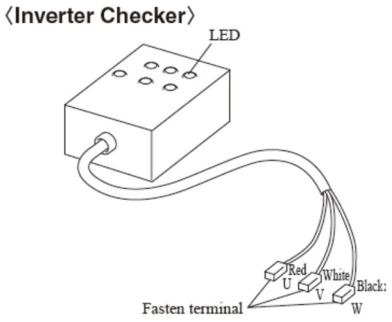
Inverter Types	
Type A:	120° Conduction Control
Type B, C & D:	Vector Control

Test Procedure – Using an Inverter Checker

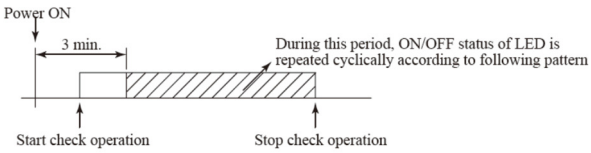
Type A SRC & KX4 Outdoor Units

Testing Method

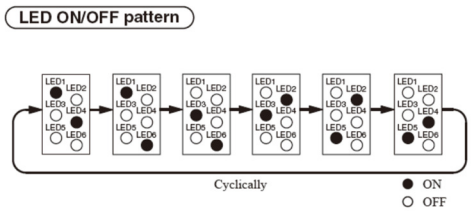
1) Setup Procedure
   a) Turn off the power to the system.
   b) Remove terminal cover from compressor and disconnect wires U, V and W.
   c) Connect disconnected wires to the inverter checker U (Red), V (White) and W (Black).



2) Operation for Judgement.
   a) Turn on the power to the system and start a test run operation in cooling or heating mode.



   b) Check the on/off status of the 6 LED's of the inverter checker.



   c) Judge the Inverter PCB by the ON/OFF status of the 6LED's of the inverter checker.

ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Inverter PCB	Normal	Anomalous

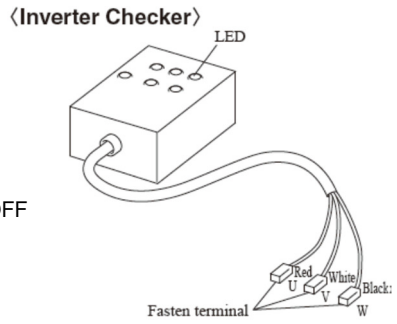
d) Stop the test run within 2 minutes from starting it.

Test Procedure – Using an Inverter Checker

Type B - FDC VN, VS, VNA, VSA, VNX, VSX & KX6 Outdoor Units

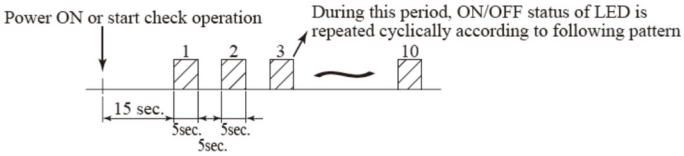
Testing Method

1) Setup Procedure
   a) Turn off the power to the system.
   b) Remove terminal cover from compressor and disconnect wires U, V and W.
   c) Connect disconnected wires to an inverter checker U (Red), V (White) and W (Black).
   d) Switch JSW10-4 on the outdoor unit's inverter PCB ON.

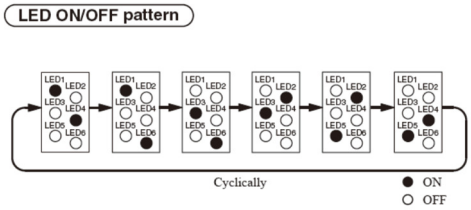


Operation for Judgement

2) a) Turn on the power to the system.
   b) About 15seconds after power is switched on the LEDs should start to cycle 5 seconds ON/OFF



   c) Check the on/off status of the 6 LED's of the inverter checker.



   d) Judge the Inverter PCB by the ON/OFF status of the inverter checkers 6 LED's

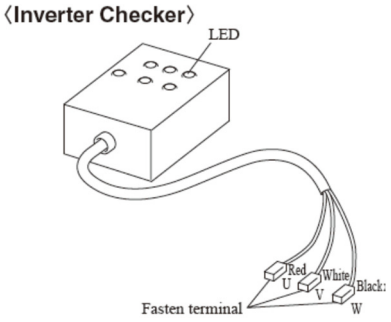
ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Inverter PCB	Normal	Anomalous

   e) Switch OFF JSW10-4 on the inverter PCB once test is complete.

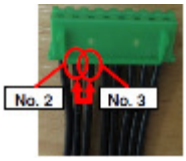
Type C - SRC & FDC VNP Outdoor Units

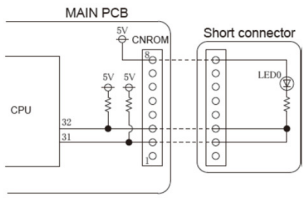
Testing Method

1) Setup Procedure
   a) Turn off the power to the system.
   b) Remove terminal cover from compressor and disconnect wires U, V and W.
   c) Connect disconnected wires to the inverter checker U (Red), V (White) and W (Black).
   d) With mains power OFF connect a short connector to CNROM on the PCB linking pins 2 and 3.

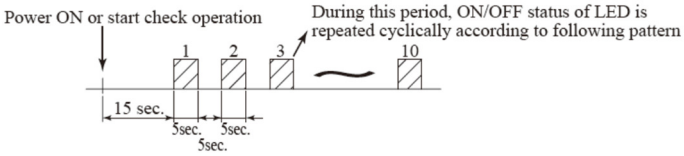


SHORT CONNECTOR

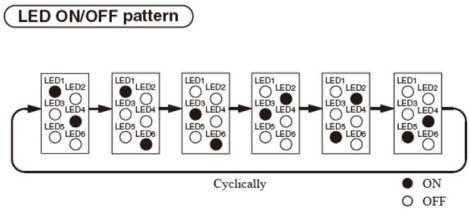




2) Operation for Judgement
   a) Turn on the power to the system.
   b) About 15seconds after power is switched on the LEDs should start to cycle 5seconds ON/OFF



   c) Check the on/off status of the 6 LED's of the inverter checker.



   d) Judge the Inverter PCB by the ON/OFF status of the inverter checkers 6 LED's

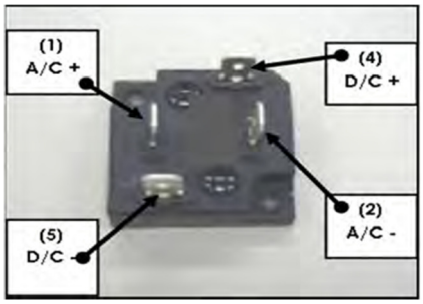
ON/OFF status of LED	If all of LED are ON/OFF according to following pattern	If all of LED stay OFF or some of LED are ON/OFF
Inverter PCB	Normal	Anomalous

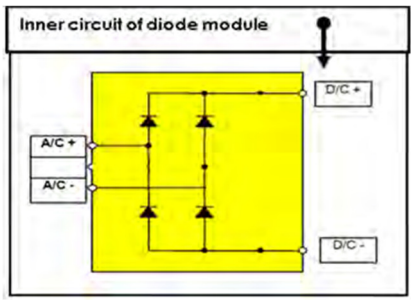
   e) Power off and remove short connector from CNROM once test is completed.

Test Procedure – 1PH & 3PH Diode Module

"WARNING" Power off the unit, waiting a minimum 3 minutes before removing any applicable wiring. Ensure to measure that the DC voltage has discharged sufficiently before carrying out the below testing.

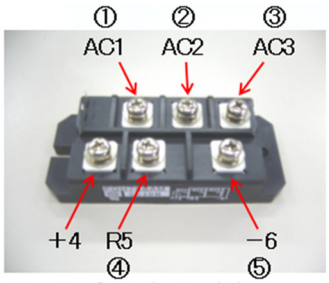
1 Phase Diode Module



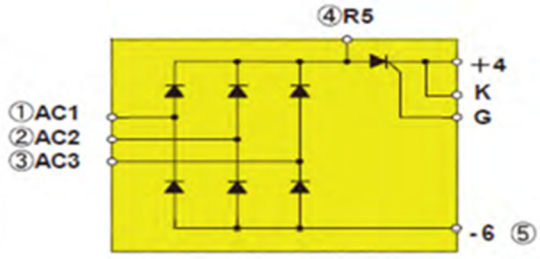


Test No.	Tester (+) (Red)	Tester (-) (Black)	Result using Multimeter (Resistance)	Result using Diode Tester (Buzzer)
1	(1)	(4)	Several MΩ	On
2	(2)	(4)	Several MΩ	On
3	(5)	(1)	Several MΩ	On
4	(5)	(2)	Several MΩ	On
5	(4)	(1)	Several 10MΩ	Off
6	(4)	(2)	Several 10MΩ	Off
7	(1)	(5)	Several 10MΩ	Off
8	(2)	(5)	Several 10MΩ	Off

3 Phase Diode Module



Layout of Diode Module



Inner circuit of diode module

G-K 240V

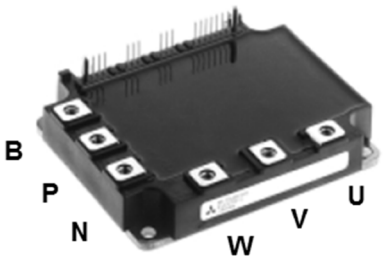
Measure the resistance of the points (N0. 1-12) as shown in the following table using a circuit tester.
① -⑤ are the terminal No. shown in the above drawing.

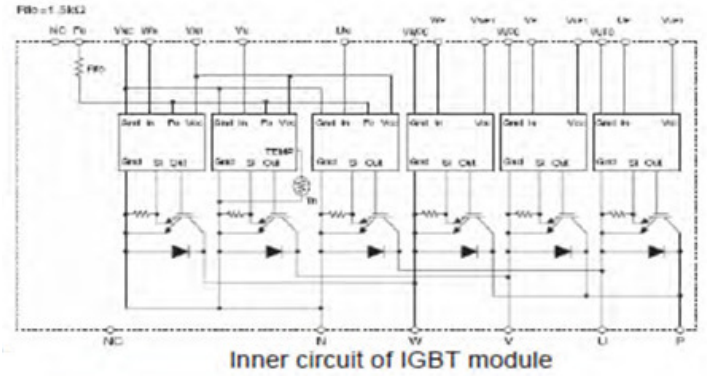
No.	Tester (+) (Red)	Tester (-) (Black)	Resistance (Ohm)	Remarks
1	①	④	Several MΩ	Upper arm U in normal direction
2	②	④	Several MΩ	Upper arm V in normal direction
3	③	④	Several MΩ	Upper arm W in normal direction
4	⑤	①	Several MΩ	Lower arm U in normal direction
5	⑤	②	Several MΩ	Lower arm V in normal direction
6	⑤	③	Several MΩ	Lower arm W in normal direction
7	④	①	Several 10MΩ	Upper arm U in reverse direction
8	④	②	Several 10MΩ	Upper arm V in reverse direction
9	④	③	Several 10MΩ	Upper arm W in reverse direction
10	①	⑤	Several 10MΩ	Lower arm U in reverse direction
11	②	⑤	Several 10MΩ	Lower arm V in reverse direction
12	③	⑤	Several 10MΩ	Lower arm W in reverse direction

<Judgement>
i) If the resistance is 0-several kOhms the diode module could be burnt.
ii) If the resistance is infinity (∞), the diode module could be burnt
In case that the jugement is i) or ii) above replace the diode module

Test Procedure – 3 PH Transistor Module

"WARNING" Power off the unit, waiting a minimum 3 minutes before removing any applicable wiring.
Ensure to measure that the DC voltage has discharged sufficiently before carrying out the below testing.




Inner circuit of IGBT module

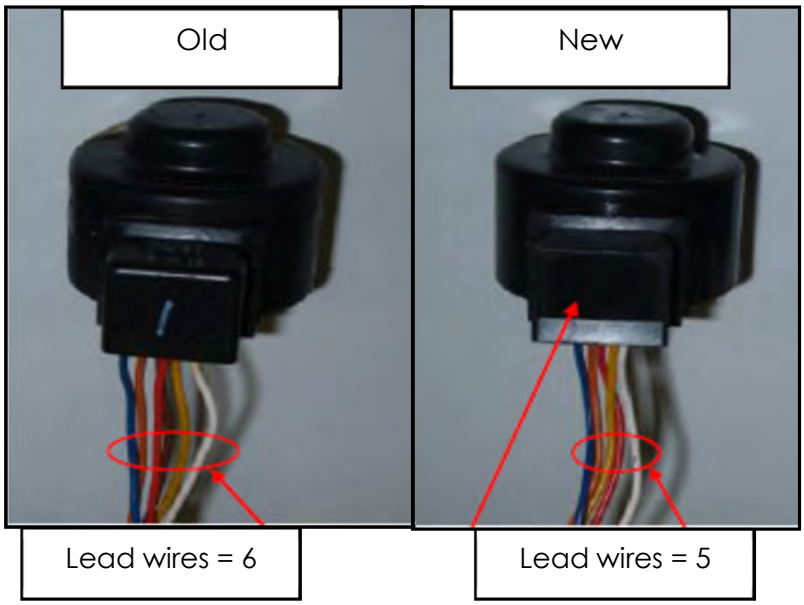
Measure the resistance of the points shown in the following table using a circuit tester.
P, N, U, V and **W** are the terminal No. shown in the above drawing.

Tester (+) (Red)	Tester (-) (Black)	Result using Multimeter (Resistance)
P	N	OL / Several 10MΩ
N	P	Several MΩ
P	U	OL / Several 10MΩ
P	V	OL / Several 10MΩ
P	W	OL / Several 10MΩ
N	U	Several 100kΩ
N	V	Several 100kΩ
N	W	Several 100kΩ
U	P	Several 100kΩ
V	P	Several 100kΩ
W	P	Several 100kΩ
U	N	OL / Several 10MΩ
V	N	OL / Several 10MΩ
W	N	OL / Several 10MΩ

<Judgement>
If the resistance is 0- a few kOhms there is a possibility that the elements are damaged
so replace the power transistor.

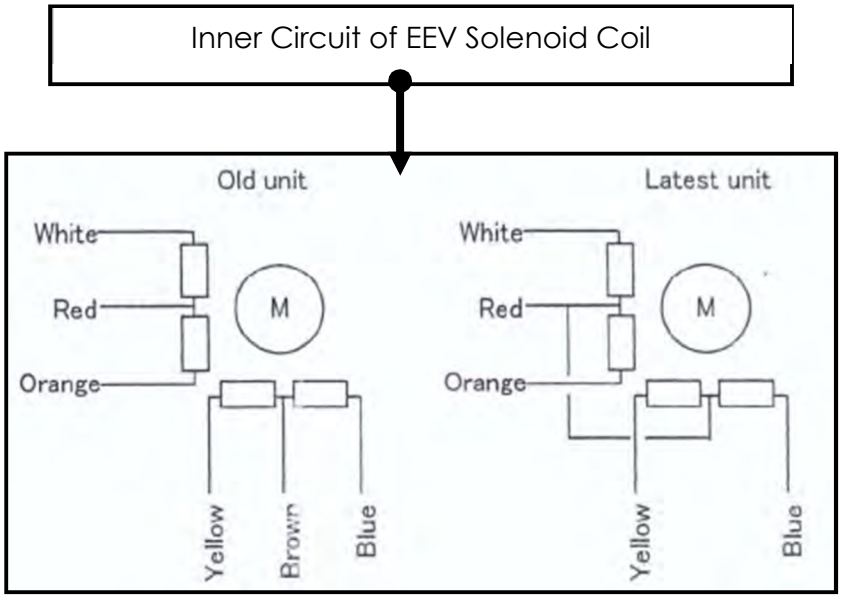
Test Procedure – Electronic Expansion Valve

"WARNING" Power off the unit, waiting a minimum 3 minutes before removing any applicable wiring.
Ensure to measure that the DC voltage has discharged sufficiently before carrying out the below testing.



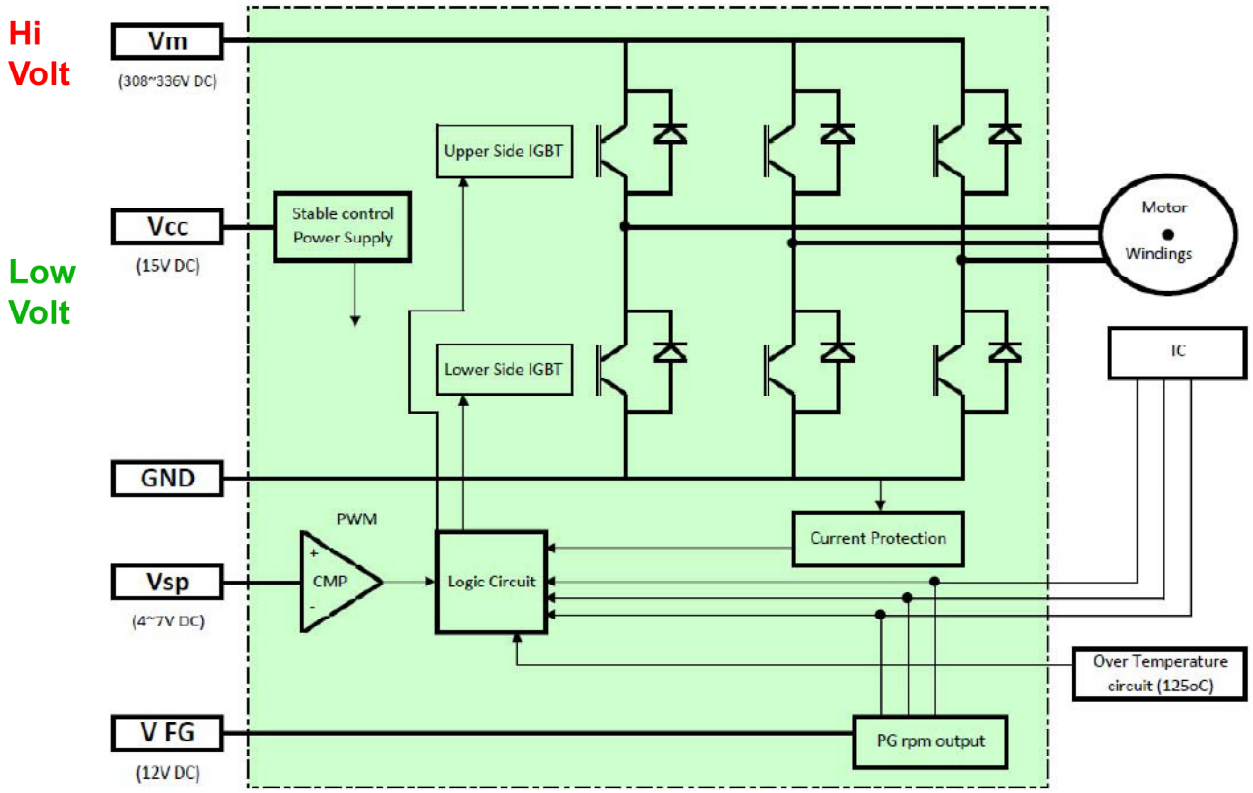
Measure the resistance points as per the following table by Multi-meter.

If readings are within the nominated table values, it is normal.



From	To	Reference Resistance	Old	New
White	Red	45 - 50 Ohms	Yes	Yes
Red	Orange	45 - 50 Ohms	Yes	Yes
Orange	White	90 - 100 Ohms	Yes	Yes
Yellow	Brown	45 - 50 Ohms	Yes	not applicable
Brown	Blue	45 - 50 Ohms	Yes	not applicable
Blue	Yellow	90 - 100 Ohms	Yes	Yes
Yellow	Red	45 - 50 Ohms	not applicable	Yes
Red	Blue	45 - 50 Ohms	not applicable	Yes
Blue	Yellow	90 - 100 Ohms	not applicable	Yes

DC FAN MOTOR TESTING



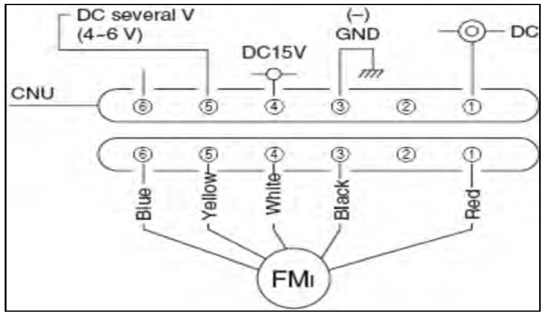
Expected Readings of Control PWB VDC Outputs to DCFM			Expected Readings of DC Fan Motor Circuit Board Resistances		
Multi Meter Test Points for VDC			Multi Meter Test Points for Ω		
Multi-meter Red Probe	Multi-meter Black Probe	PCB DC Volts	Multimeter Black Probe	Multi-meter Red Probe	DCFM PWB Resistance Value
Vm	Gnd	# 300 ~ 350 Vdc	Vm	Gnd	# > 1 MΩ
Vcc	Gnd	# 15 Vdc	Vcc	Gnd	# > 4 KΩ
Vsp	Gnd	* 2 ~ 7 Vdc	Vsp	Gnd	# > 100 KΩ
Vfg	Gnd	* 2 ~ 7 Vdc	Vfg	Gnd	
* All Series – Voltages are only present during operation. # ZM Series onwards - Voltages are only present during operation.			# If Resistance Values are ok, confirm with DCFM Tester. Note: If no resistance value is evident, reverse multi-meter probes and re-test.		

Wiring of DC Fan Motor		DC Fan Motor Type				
		Type A	Type B	Type C	Type D	Type E
Vm	Motor Power Voltage Input	Red	Red	Red	Red	Red
Gnd	Ground	Black	Blue	Blue	Black	Blue
Vcc	Control Power Voltage Input	White	Brown	Brown	White	Brown
Vsp	Speed Control Voltage Input	Yellow	Orange	Orange	Yellow	Orange
Vfg	Revolution Pulse Output	Blue	White	White	Blue	White

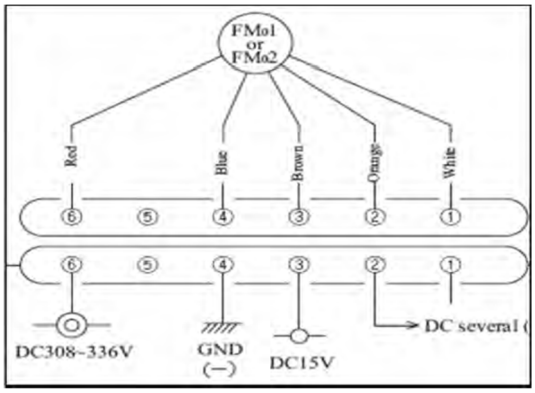
IMPORTANT NOTE: The current version of the DCFM Tool, Part No: RMA006A012A (short/wide model) can run/test the Type C fan motor. The original version of the DCFM Tool, Part No: RMA006A012 (long/narrow model) cannot run/test the Type C fan motor.

DC FAN MOTOR TESTING

Type ‘A’ Fan Motor



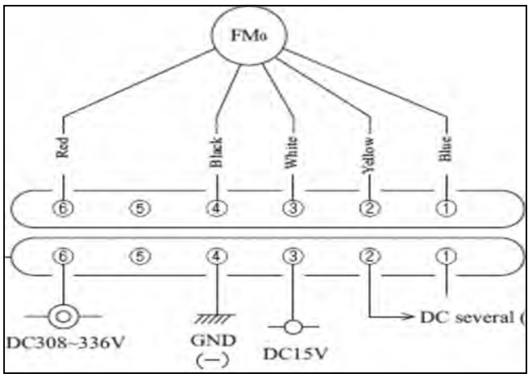
Type ‘B’ & ‘C’ Fan Motor



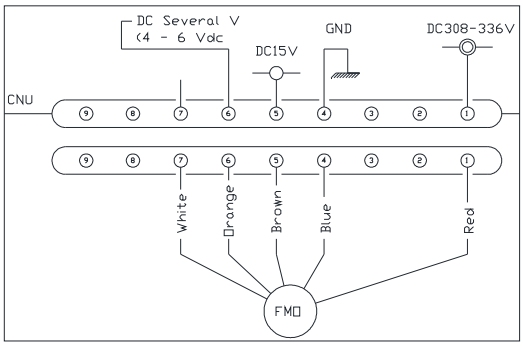
Type “B”

Type “C”

Type ‘D’ Fan Motor



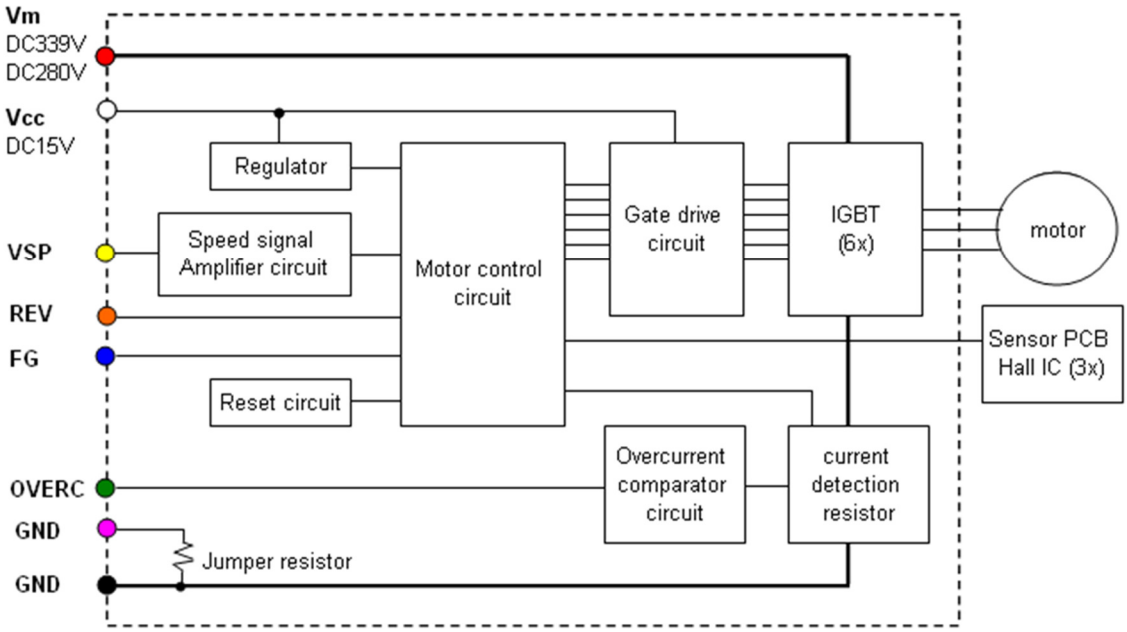
Type ‘E’ Fan Motor



DC FAN MOTOR TESTING

KX Models

Outline of the driver circuit



Resistance of motor's coil

Measure point	Tester (+) Red	Tester (-) Black	Resistance (Ohm)	Tester (-) Black	Tester (+) Red	Resistance (Ohm)
Vm - GND	Red	Black	several ten MΩ	Black	Red	several MΩ
Vcc - GND	White	Pink	several kΩ	Pink	White	several kΩ
Vsp - GND	Yellow	Pink	several handred kΩ	Pink	Yellow	several handred kΩ
FG - GND	Blue	Pink	OL	Pink	Blue	several ten MΩ
Vm -Vcc	Red	White	several ten MΩ	White	Red	several MΩ
Vm - Vsp	Red	Yellow	several ten MΩ	Yellow	Red	several MΩ
Vm - FG	Red	Blue	OL	Blue	Red	OL
Vcc - Vsp	White	Yellow	several handred kΩ	Yellow	White	several handred kΩ
Vcc - FG	White	Blue	several ten MΩ	Blue	White	OL
Vsp - FG	Yellow	Blue	several ten MΩ	Blue	Yellow	OL

REV : Reverse turn detection output
Vsp : Speed command output
FG : RPM monitor input
Over C : Over - current error input

Connection Table of Power Lead Wires

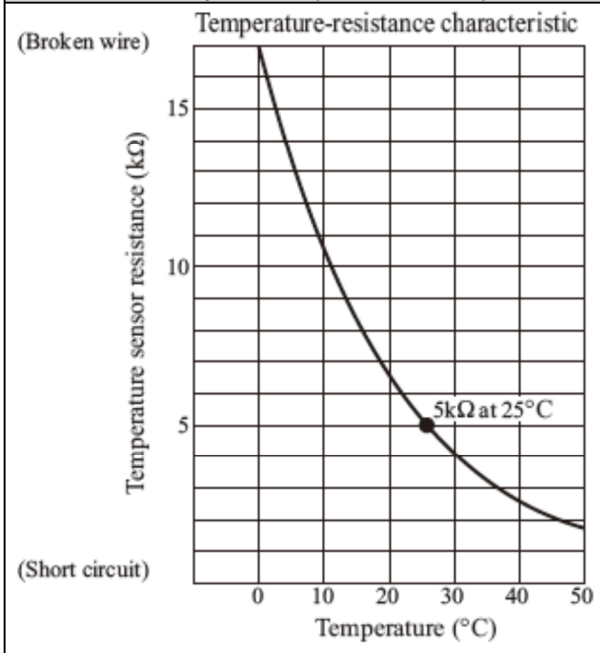
No.	Color code	
1	RED	Vm
2	BLACK	GND

Connection Table of Sensor Lead Wires

No.	Color code	
1	WHITE	Vcc
2	ORANGE	REV
3	YELLOW	VSP
4	BLUE	FG
5	GREEN	OVERC
6	PINK	GND

THERMISTOR TEMPERATURE & RESISTANCE CHARACHERISTICS

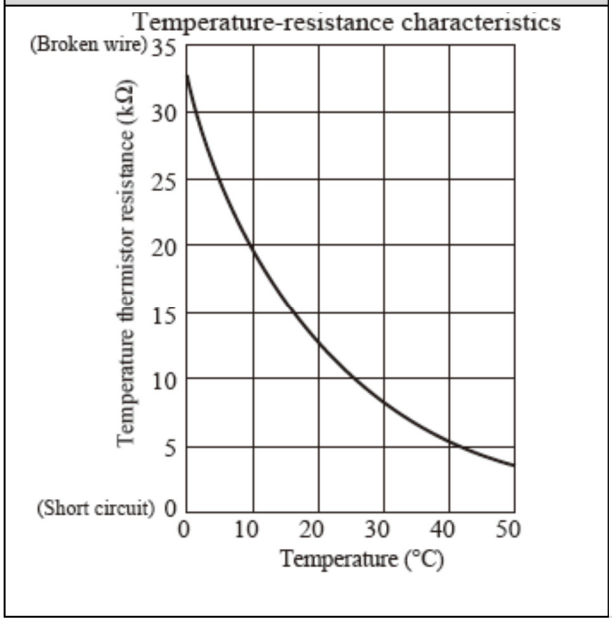
Indoor Return Air Sensor (THI-A1)
Indoor Heat Exchanger Sensor (THI-R1, R2 & R3)
Outdoor Air Temperature Sensor (THO-A) RAC
Outdoor Heat Exchanger Sensor (THO-R1, R2, R3 & R4)
Outdoor Suction Pipe Sensor (THO-S & THO-H)



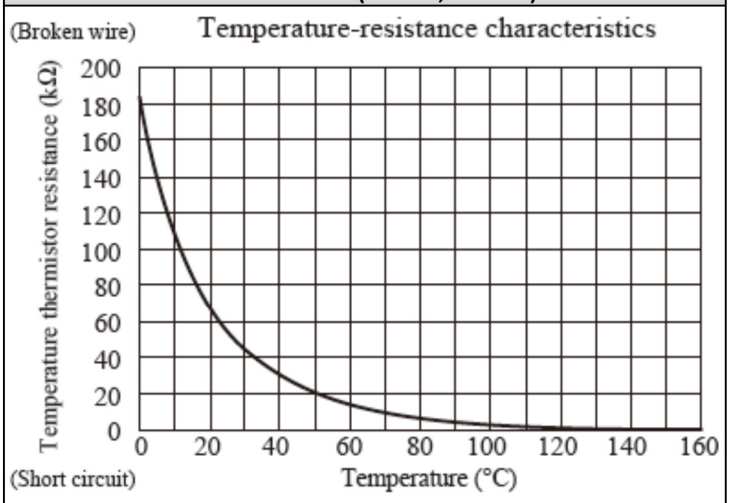
Remote Control Temperature Sensor (ThC)

Resistance-temperature characteristics			
Temperature °C	Resistance KΩ	Temperature °C	Resistance KΩ
0	65	30	16
1	62	32	15
2	59	34	14
4	53	36	13
6	48	38	12
8	44	40	11
10	40	42	9.9
12	36	44	9.2
14	33	46	8.5
16	30	48	7.8
18	27	50	7.3
20	25	52	6.7
22	23	54	6.3
24	21	56	5.8
26	19	58	5.4
28	18	60	5.0

Outdoor Air Temperature Sensor (THO-A) PAC & KX

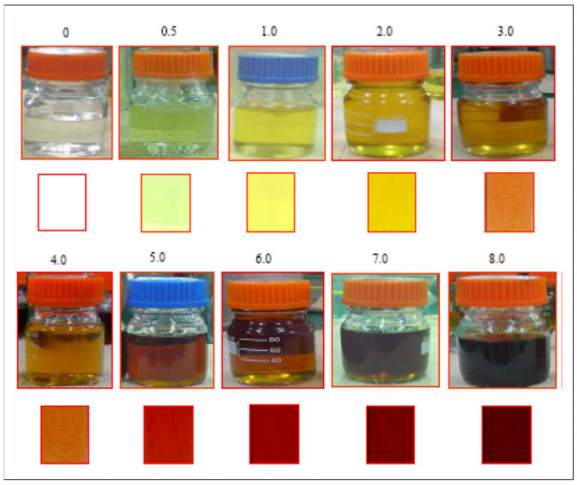


Outdoor Discharge Pipe Sensor (THO-D1 & THO-D2)
Outdoor Power Transistor Sensor (THO-IP, P1 & P2)



TROUBLE SHOOTING REFRIGERATION SYSTEM						
	Refrigerant Pressure					Cause
Location	Extra Low	Low	Normal	High	Extra High	
High Side					●	Excessive refrigerant overcharge Non condensibles in the system
High Side					●	Faulty outdoor fan motor Blocked outdoor unit heat exchanger Liquid flooded outdoor heat exchanger
High Side				●		High indoor return air temperature Excessive load
High Side		●				Insufficient refigerant Gas leak Blockage
High Side	●					Ineffective compressor compression Liquid refrigerant flooding back from indoor unit
Low Side					●	Bypass valve open
Low Side					●	Mixture of non condensibles
Low Side					●	High indoor return air temperature
Low Side				●		High ambient temperature Mixture of non condensibles
Low Side		●				Lack of Load Restricted/Blocked liquid line Low refrigerant charge
Low Side	●					Blocked filter Indoor fan fault Dirty indoor unit heat exchanger

Colour of Compressor oil



Sample Number	Oil State
0 - 1	Normal
2 - 3	Slight moisture contamination
4 - 5	High temperature or high moisture content
6+	Compressor motor burnout

Refrigerant Oils Used

Refrigerant	Oil Reference	Type	Viscosity @40°C	Viscosity @100°C	Bottle Volume	SAP Code
R32	FW50S	PVE	48.42	6.48		-
R32	MB75	POE	To Be Confirmed			-
R410A	FV50S	PVE	50.69	6.79		-
R410A	FVC68D (SA08145)	PVE	66.6	8.04	1.0l	-
R410A	M-MA32R (SA05317)	POE	30.6		0.5l	631091
R410A	M-MA32R (SA05316)	POE	30.6		4l	631089
R410A	M-MA68 (SA08007)	POE	68		4l	-

Refrigerant Piping Information

RAC CURRENT MODELS

Model	Precharged Piping Length (m)	Maximum Piping Length (m)	Maximum Vertical Piping Length (m)		Factory Charge R410A (kg)	Additional Charge R410A per m (g/m)	Pipe Sizes		MCB Rating A
			O/D Above	I/D Above			Liquid Pipe " (mm)	Gas Pipe " (mm)	
SRC25ZMP-S,	10	15	10	10	0.655	20	1/4" (6.35)	3/8" (9.52)	16
SRC35ZMP-S	15	15	10	10	0.810	N/A	1/4" (6.35)	3/8" (9.52)	16
SRC45ZMP-S	15	25	15	15	1.200	20	1/4" (6.35)	1/2" (12.7)	16
SRC25ZSP-S,	10	15	10	10	0.655	20	1/4" (6.35)	3/8" (9.52)	16
SRC35ZSP-S	15	15	10	10	0.810	N/A	1/4" (6.35)	3/8" (9.52)	16
SRC45ZSP-S	15	25	15	15	1.200	20	1/4" (6.35)	1/2" (12.7)	16
SRC25ZM-S	15	15	10	10	0.750	N/A	1/4" (6.35)	3/8" (9.52)	16
SRC35ZM-S	15	15	10	10	1.050	N/A	1/4" (6.35)	3/8" (9.52)	16
SRC50ZM-S	15	25	15	15	1.350	20	1/4" (6.35)	1/2" (12.7)	16
SRC20_25ZS-S	15	20	10	10	0.750	20	1/4" (6.35)	3/8" (9.52)	16
SRC35ZS-S	15	20	10	10	0.950	20	1/4" (6.35)	3/8" (9.52)	16
SRC50ZS-S	15	25	15	15	1.250	20	1/4" (6.35)	1/2" (12.7)	20
SRC20_35ZMX-S	15	15	10	10	1.200	N/A	1/4" (6.35)	3/8" (9.52)	16
SRC50_60ZMX-S	15	30	20	20	1.500	20	1/4" (6.35)	1/2" (12.7)	16
SRC20_35ZSX-S	15	25	15	15	1.450	20	1/4" (6.35)	3/8" (9.52)	16
SRC50_60ZSX-S	15	30	20	20	1.500	20	1/4" (6.35)	1/2" (12.7)	16
SRC63ZR-S	15	30	20	20	1.550	20	1/4" (6.35)	1/2" (12.7)	16
SRC71ZR-S	15	30	20	20	1.800	25	1/4" (6.35)	5/8" (15.88)	20
SRC80ZR-S	15	30	20	20	1.900	25	1/4" (6.35)	5/8" (15.88)	20
FDC100VNP	15	30	20	20	2.550	60	3/8" (9.52)	5/8" (15.88)	32

SCM Multi Splits

For SCM Systems the maximum one way piping length to an indoor unit is 25 metres.

Model	Precharged Piping Length (m)	Maximum Piping Length (m)	Maximum Vertical Piping Length (m)		Factory Charge R410A (kg)	Additional Charge R410A per m (g/m)	Pipe Sizes		MCB Rating A
			O/D Above	I/D Above			Liquid Pipe " (mm)	Gas Pipe " (mm)	
SCM40ZS-S	30	30	15	15	1.900	N/A	2x 1/4" (6.35)	2x 3/8" (9.52)	25
SCM45ZS-S	30	30	15	15	1.900	N/A	2x 1/4" (6.35)	2x 3/8" (9.52)	25
SCM50ZS-S	40	40	15	15	2.500	N/A	3x 1/4" (6.35)	3x 3/8" (9.52)	25
SCM45ZM-S	30	30	15	15	2.000	N/A	2x 1/4" (6.35)	2x 3/8" (9.52)	25
SCM60ZM-S	40	40	15	15	2.500	N/A	3x 1/4" (6.35)	3x 3/8" (9.52)	25
SCM80ZM-S	40	70	20	20	3.150	20	4x 1/4" (6.35)	4x 3/8" (9.52)	25
SCM100_125ZM-S	50	90	20	20	6.000	20	5x 1/4" (6.35)	5x 3/8" (9.52)	32

PAC Splits - CURRENT MODELS

Model	Precharged Piping Length (m)	Maximum Piping Length (m)	Maximum Vertical Piping Length (m)		Factory Charge R410A (kg)	Additional Charge R410A per m (g/m)	Pipe Sizes		MCB Rating A(/ph)
			O/D Above	I/D Above			Liquid Pipe "" (mm)	Gas Pipe "" (mm)	
FDC71VNP	15	30	20	20	1.600	20	1/4" (6.35)	1/2" (12.7)	20
FDC90VNP	15	30	20	20	2.100	20	1/4" (6.35)	5/8" (15.88)	20
FDC100VNP	15	30	20	20	2.550	60	3/8" (9.52)	5/8" (15.88)	32
FDC100VNA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	32
FDC125VNA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	32
FDC140VNA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	32
FDC71VNX	30	50	30	15	2.950	60	3/8" (9.52)	5/8" (15.88)	25
FDC100VNX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	32
FDC125VNX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	32
FDC140VNX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	32
FDC100VSA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	20
FDC125VSA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	20
FDC140VSA	30	50	50	15	3.800	60	3/8" (9.52)	5/8" (15.88)	20
FDC100VSX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	20
FDC125VSX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	20
FDC140VSX	30	100	30	15	4.500	60	3/8" (9.52)	5/8" (15.88)	20
FDC200VSA	30	70	30	15	5.600	60	3/8" (9.52)	7/8" (22.22)	32
FDC250VSA	30	70	30	15	7.200	120	1/2" (12.7)	1-1/8" (28.58)	32

Refrigerant Piping Information

Historic Models

Model	Precharged Piping Length (m)	Maximum Piping Length (m)	Maximum Vertical Piping Length (m)		Factory Charge R410A (kg)	Additional Charge R410A per m (g/m)	Pipe Sizes	
			O/D Above	I/D Above			Liquid Pipe "" (mm)	Gas Pipe "" (mm)
SRC20_25ZD,ZF,ZG	15	15	10	10	0.900	N/A	1/4" (6.35)	3/8" (9.52)
SRC20_325ZGX-S	15	15	10	10	1.200	N/A	1/4" (6.35)	3/8" (9.52)
SRC20,25ZJ-S	15	15	10	10	0.750	N/A	1/4" (6.35)	3/8" (9.52)
SRC35ZD,ZG	15	15	10	10	1.100	N/A	1/4" (6.35)	3/8" (9.52)
SRC35ZJ-S	15	15	10	10	1.050	N/A	1/4" (6.35)	3/8" (9.52)
SRC20ZJ-S1	15	15	10	10	0.750	N/A	1/4" (6.35)	3/8" (9.52)
SRC25,35ZJ-S1	15	15	10	10	1.150	N/A	1/4" (6.35)	3/8" (9.52)
SRC50ZD,ZG,ZJ-S,ZJ-S1	15	25	15	15	1.350	20	1/4" (6.35)	3/8" (9.52)
SRC20,25,35,ZIX,ZJX-S,ZJX-S1	15	15	10	10	1.200	N/A	1/4" (6.35)	3/8" (9.52)
SRC50,60ZFX,ZGX,ZHX,ZIX	15	30	20	20	1.400	20	1/4" (6.35)	1/2" (12.7)
SRC50,60ZJX-S	15	30	20	20	1.500	20	1/4" (6.35)	1/2" (12.7)
SRC63_71-S,S1	15	30	20	20	1.900	25	1/4" (6.35)	5/8" (15.88)
SRC63,71,80,ZK-S	15	30	20	20	1.800	25	1/4" (6.35)	5/8" (15.88)
SRC63ZM-S	15	30	20	20	1.800	25	1/4" (6.35)	5/8" (15.88)
SRC71_80ZM-S	15	30	20	20	1.800	25	1/4" (6.35)	5/8" (15.88)
SCM45ZG-S	20	30	15	15	1.600	20	2x 1/4" (6.35)	2x 3/8" (9.52)
SCM60ZG-S	30	40	15	15	2.200	20	3x 1/4" (6.35)	3x 3/8" (9.52)
SCM80ZG-S	40	70	20	20	3.150	20	4x 1/4" (6.35)	4x 3/8" (9.52)
SCM45ZJ-S	30	30	15	15	2.000	N/A	2x 1/4" (6.35)	2x 3/8" (9.52)
SCM60ZJ-S,S1	40	40	15	15	2.500	N/A	3x 1/4" (6.35)	3x 3/8" (9.52)
SCM80ZJ-S,S1	40	70	20	20	3.150	20	4x 1/4" (6.35)	4x 3/8" (9.52)
SCM100,125ZJ-S,S1	50	90	20	20	6.000	20	5x 1/4" (6.35)	5x 3/8" (9.52)
FDCVA151,201HEN	30	40	30	15	1.550	20	1/4" (6.35)	1/2" (12.7)
FDCVA251HEN	30	40	30	15	1.750	20	1/4" (6.35)	5/8" (15.88)
FDCVA302HENR,AR	30	50	30	15	2.950	60	3/8" (9.52)	5/8" (15.88)
FDCVA402_602HENR,AR	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC71VN	30	50	30	15	2.950	60	3/8" (9.52)	5/8" (15.88)
FDC100VN	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC125VN	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC140VN	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC100VS	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC125VS	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC140VS	30	50	30	15	3.800	60	3/8" (9.52)	5/8" (15.88)
FDC200VS	30	70	30	15	5.400	60	3/8" (9.52)	7/8" (22.22)
FDC250VS	30	70	30	15	7.200	120	1/2" (12.7)	7/8" (22.22)

Note: If the one way pipe length is less than 3m remove refrigerant from the system pre-charge

SRC20- 80 Models	–	200g
FDC71-90VNP Models	–	200g
FDC100VNP Model	–	600g
FDC71-200 Models	–	1500g
FDC250VS Model	-	2400g

KX SYSTEM REFRIGERANT CHARGE CALCULATION

KX4 VRF Systems

The additional charge to be added for local refrigerant piping is calculated as follows:

Required Charge(R) = { (l1 x 0.022) + (l2 x 0.054) + (l3 x 0.11) + (l4 x 0.17) + (l5 x 0.25) (l6 x 0.35) } x A

Additional R410A Charge (L) for Liquid Line Lengths

Liquid Line Diameter Inches		1/4"	3/8"	1/2"	5/8"	3/4"	7/8"
Liquid Line Diameter mm		6.35	9.52	12.70	15.88	19.05	22.20
Additional Charge kg/m	c	0.022	0.054	0.110	0.170	0.250	0.350
Liquid Line Length	l	l1	l2	l3	l4	l5	l6
Additional Charge per line	C	l1 x c1	l2 x c2	l3 x c3	l4 x c4	l5 x c5	l6 x c6
Total Additional Charge for Liquid Lines	L	C1 + C2 + C3 + C4 + C5 + C6					kg

3 Pipe Systems Correction Coefficient (A)

Outdoor Unit Capacity		FDCA140-1360KXE4	FDCA224-680KXRE4	FDCA735-1360KXRE4
Correction Factor	A	1	1.3	1.2

Additional R410A Required	R	T x A	kg

Total System Charge of R410A

The Systems total refrigerant charge is calculated as follows:

System Charge = U + [{ (l1 x 0.022) + (l2 x 0.054) + (l3 x 0.11) + (l4 x 0.17) + (l5 x 0.25) (l6 x 0.35) } x A]

Supplied Refrigerant Charge (U)

Model	Factory Charge U
FDCA140-160KXE4	7.5 kg
FDCA224-335KX(R)E4	14.2 kg
FDCA335HKX(R)E4-K, FDCA400-450KX(R)E4	17.0 kg
FDCA504-560HKX(R)E4	19.4 kg
FDCA615-680HKX(R)E4	26.2 kg

TOTAL SYSTEM CHARGE R410A	R + U	kg

KX6 MICRO and MINI VRF Systems

The Additional Charge calculation is as follows:

Additional Charge = S + { (l1 x 0.022) + (l2 x 0.054) + (l3 x 0.110) + (l4 x 0.170) }

Additional R410A Charge (L) for Liquid Line Lengths

Liquid Line Diameter Inches		1/4"	3/8"	1/2"	5/8"
Liquid Line Diameter mm		6.35	9.52	12.70	15.88
Additional Charge kg/m	c	0.022	0.054	0.110	0.170
Liquid Line Length	l	l1	l2	l3	l4
Additional Charge per line	C	l1 x c1	l2 x c2	l3 x c3	l4 x c4
Total Additional Charge for Liquid Lines	L	C1 + C2 + C3 + C4			kg

Standard (S) Additional Charge

Model		Standard Additional Charge S
FDC112-155KXE6	(Convert Pre Charge to 3.38kg Base Charge)	-1.62 kg
FDC224-335KXE6		0.0 kg

TOTAL ADDITIONAL CHARGE R410A	R	S + L	kg

Total System Charge of R410A

The total System charge calculation is as follows

System Charge = U + S + { (l1 x 0.022) + (l2 x 0.054) + (l3 x 0.11) + (l4 x 0.17) }

Supplied Refrigerant Charge (U)

Model	Factory Charge U
FDC112-155KXE6*	5.0 kg
FDC224-336KXE6	11.5 kg

TOTAL SYSTEM CHARGE R410A	T	U + R	kg

KX6 VRF Systems

The Additional Charge calculation is as follows:

Additional Charge = I + S + [{ (l1 x 0.022) + (l2 x 0.054) + (l3 x 0.12) + (l4 x 0.18) + (l5 x 0.26) (l6 x 0.37) } x A]

Additional R410A Charge (L) for Liquid Line Lengths

Liquid Line Diameter Inches		1/4"	3/8"	1/2"	5/8"	3/4"	7/8"
Liquid Line Diameter mm		6.35	9.52	12.70	15.88	19.05	22.20
Additional Charge kg/m	c	0.022	0.059	0.120	0.180	0.260	0.370
Liquid Line Length	l	l1	l2	l3	l4	l5	l6
Additional Charge per line	C	l1 x c1	l2 x c2	l3 x c3	l4 x c4	l5 x c5	l6 x c6
Total Additional Charge for Liquid Lines	L	C1 + C2 + C3 + C4 + C5 + C6				kg	

3 Pipe Systems Correction Coefficient (A)

Outdoor Unit Capacity		FDC400-1360KXE6	FDC224-1360KXRE6
Correction Factor	A	1	1.4

ADDITIONAL CHARGE R410A	P	L x A	kg

IMPORTANT

If the additional Charge (P) exceeds the following charges the system MUST be split:

Model	Additional Charge P
FDC224-680KXRE6	50.0 kg
735-1360KX(R)E6	100.0 kg

Standard (S) Additional Charge

Model	Standard Additional Charge S
FDC224-335KXRE6	0.0 kg
FDC400KX(R)E6	1.3 kg
FDC450KXE(R)6	3.1 kg
FDC504KX(R)E6	4.8 kg
FDC560KX(R)E6	5.9 kg
FDC615KX(R)E6	7.1 kg
FDC680KX(R)E6	8.4 kg
FDC735KX(R)E6	1.7 kg
FDC800KX(R)E6	2.6 kg
FDC850KX(R)E6	4.4 kg
FDC900KX(R)E6	6.2 kg
FDC960KX(R)E6	7.9 kg
FDC1010KX(R)E6	9.6 kg
FDC1065KX(R)E6	10.7 kg
FDC1130KX(R)E6	11.8 kg
FDC1180KX(R)E6	13.0 kg
FDC1235KX(R)E6	14.2 kg
FDC1300KX(R)E6	15.5 kg
FDC1360KX(R)E6	16.8 kg

Additional Charge (I) for Indoor Units

Indoor Unit Capacity	F	Sum of indoor unit model numbers i.e FDT112KXE6F
Outdoor Unit Capacity	O	i.e FDC1360KXRE6
Additional Charge for Indoor Unit Loading if (F-(Ox1.3))>0	I	{ F - (O x 1.3) } x 0.01

TOTAL ADDITIONAL CHARGE R410A	R	I + S + P	kg

Total System Charge of R410A

The total System charge calculation is as follows

System Charge = U + I + S + [{ (I1 x 0.022) + (I2 x 0.059) + (I3 x 0.12) + (I4 x 0.18) + (I5 x 0.26) (I6 x 0.37) } x A]

Supplied Refrigerant Charge (U)

Model	Factory Charge U
FDC224KXRE6	8.7 kg
FDC280KXRE6	9.9 kg
FDC335KXRE6	11.4 kg
FDC400-680KX(R)E6	11.5 kg
FDC735-1360KX(R)E6	23.0 kg

TOTAL SYSTEM CHARGE R410A		U + R	kg

Calculating CO_2 Equivalent

The fgas Leak Check thresholds expressed in weight of refrigerant have been replaced, in the new fgas regulations by thresholds expressed in tonnes of CO_2 equivalent quantities.

For R401A the tonnes CO2 equivalent is calculated by multiplying the total system charge weight (T) by 2.088

Refrigerant		R32	R410A
GWP Factor	G	0.675	2.088

Tonnes CO_2 Equivalent		T x G

Leak Inspection Frequency (R32)	**No Leak Detection System**	**Leak Detection System Fitted**
Less than 7.41kg R32	No Leak Check	No Leak Check
7.41kg R410A / 5 tonnes CO_2 equiv.	12 Months	24 Months
74.01kg R410A / 50 tonnes CO_2 equiv.	6 Months	12 Months
740.74kg R410A / 500 tonnes CO_2 equiv.	Mandatory Leak detection	6 Months

Leak Inspection Frequency (R410A)	**No Leak Detection System**	**Leak Detection System Fitted**
Less than 2.39kg R410A	No Leak Check	No Leak Check
2.39kg R410A / 5 tonnes CO_2 equiv.	12 Months	24 Months
23.94kg R410A / 50 tonnes CO_2 equiv.	6 Months	12 Months
239.4kg R410A / 500 tonnes CO_2 equiv.	Mandatory Leak detection	6 Months

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