COMMUNICATION ERROR (INDOOR TO OUTDOOR)

A COMMUNICATION ERROR IS WHEN EITHER ONE OF THE UNITS (INDOOR OR OUTDOOR) HAS STOPED COMMUNICATING (TALKING) TO THE OTHER.



DANGER: these test are done while the system has live power to it, these test <u>MUST</u> be performed by a <u>licensed</u> air conditioning/refrigeration mechanic or licensed electrician, if you are not licensed please do not attempt testing on any air conditioning unit.

STEP 1: You need to check to see if the system has 240V AC supplied to it and check to see if the 240V AC is going to the other unit.

*Checking 240V AC supply



*Checking interconnecting 240V AC supply





STEP 2: Need to check the communication coming out of each unit, each unit should have its own DC voltage (some units will have a static voltage and some unit will have a varying voltage, all depends on the models).

The way to do this by separating the communication line in to 2 individual side for by removing the #3 interconnecting wire out of the terminal block.

Then we need to test the DC voltage on either side of the system, to do this we just test between neutral and the interconnecting wire for indoor unit communication and between neutral and the terminal block for the outdoor unit.

*Indoor coms test



*Outdoor coms test





*Unit voltages

(DC Volt	(DC Voltage Test Mode On Multimeter, Ϋ Symbol)		
Model Type	Indoor Signal Voltage	Outdoor Signal Voltage	
AST & ART/C	60 - 120 VDC Fluctuating	60 - 120 VDC Fluctuating	
ASTA & ASTB	40 - 90 VDC Fluctuating	40 - 90 VDC Fluctuating	
ASTG	Approx. 200 VDC Static	3 - 110 VDC Fluctuating	
ARTG & 3 Phase	Approx. 295 VDC Static	3 - 110 VDC Fluctuating	

When testing the DC voltage it should be easy to see which side of the system is not sending out any communication there will be very low DC voltage on the damaged side.



STEP 3: Once we have identified which side of the system is not sending out any communication we need to test the components on that side to make sure that there's not multiple parts that have failed or caused this fault to occur, also don't want to replace a part and have it damaged again once replaced.

EXAMPLE: Lets have a look at what would be tested if the outdoor unit is found to not be sending any communication.

FIRST: Check the power supply PCB make sure there are no blown fuse and the power is exiting the board correctly. *Glass fuses on power PCB



SECOND: If power PCB is correct then move on to test the DC voltage supply for the system, the DC supply of the system is made up of 3 components (1- Diode Bridge, 2- IPM also know TR PCB, 3 – ACTPM also know Act Module), <u>before testing any</u> <u>further please turn off systems power supply.</u>

DIODE BRIDGE TESTING: Some systems will have the Diode Bridge external and some systems (like wall mount splits) will have the Diode Bridge built in to the IPM board.



TYPES OF DIODE BRIDGES: Here are a couple of examples of different types of Diode Bridges you may come across, some examples below.

*Internal Diode Bridge

Top side



Underneath



*External Diode Bridge 3 phase (single phase similar less



*The Diode Bridge is responsible for converting AC volts to DC volts

BEFORE TESTING THE DIODE BRIDGE TURN OFF POWER SUPPLY AND DISCONNECT CABLES

<u>DIODE BRIDGE TESTING</u>: this is how to test a single phase Diode Bridge.

Red Lead	Black Lead	Normal/Expected Readings	
\sim	+	Approx. 0.5v	
\sim	-	O/L	
+	\sim	O/L	
- ~		Approx. 0.5v	

*Markings for Diode Bridge legs will be on PCB where Diode is located, for external Diode Bridges please technical support assistance.



THIRD: Need to test the IPM and ACTPM, these 2 components supply DC volts to drive the compressor and also supply the DC volts to the main control PCB, with out these 2 components the rest of the system wont get an DC voltage.

IPM/TR PCB TESTING: When testing the IPM/TR PCB you will use 5 terminals, the U, V, W from the compressor and the P & N terminals (depending on the unit the P N terminal could change locations. (Make sure power supply is off when testing board) Some units wont have a ACTPM so the P & N will be located either side of the U,V,W terminals on the PCB (will look like a solder node).

Units with a ACTPM you will see that the P & N terminals will link the 2 boards together P will be the yellow wire and N will be the blue wire.

Red Lead	Black Lead	Normal/Expected Readings	
P	U	O/L	
P	V	0/L	
P	w	O/L	
N	U	Approx. 0.35 - 0.4 v	
N	v	Approx. 0.35 - 0.4 v	
N	w	Approx. 0.35 - 0.4 v	
U	Р	Approx. 0.35 - 0.4 v	
V	Р	Approx. 0.35 - 0.4 v	
W	Р	Approx. 0.35 - 0.4 v	
U	N	O/L	
V	N	O/L	
W	N	O/L	
N	P	Approx. 0.4 - 0.9 v	
Р	N	O/L	

IPM/TR PCB TEST READINGS:

*Example of a IPM/TR PCB, this is individual board type some are built into the control PCB





ACTPM / ACT MODULE TESTING: When testing the ACTPM you need to make sure the power is OFF and the cables are disconnected to in sure a correct reading.

*ACTPM / ACT MODULE



*When replacing the IPM/TR PCB or ACTPM/Act Module **you need to apply heat paste** to the back of both the boards, if you fail to do so or don't put enough on the boards will heat up after a short period of time and fail again. They will NOT be replaced under warranty if this happens. *If either IPM/TR PCB or ACTPM/Act Module fail the test double check the compressor to make sure it hasn't failed also.

*Test procedure for ACTPM / ACT MODULE

Red Lead	Black Lead	Lead Normal/Expected Reading	
+	-	- 360 k Q ± 20%	
-	N1	0 Q	
P	N1	360 k Q ± 20%	
Р	+	720 k Q ± 20%	
L1	L2	Over 1M Q	
L1	EARTH	O/L	
L2	EARTH	O/L	
L2	N2	Över 1M Q	
L2	Р	Over 1M Q	
Ρ	L2	Over 1M Q	

*TO ORDER HEAT PASTE PLEASE CONTACT SPARE PARTS - PART NUMBER 0000039795



FOURTH: If the everything has checked out fine on the DC supply side of the system need to test condenser fan motor and expansion valve coil, if either of these components are faulty they will drag the DC volts out of the control PCB.

FAN MOTOR TESTING: The condenser fan motor is a DC motor you will need diode check on you meter to test the motor correctly.

*Fan motor test

Red Lead	Black Lead	Normal/Expected Readings	
Red	Black	O/L	
Black	Red	0.8 - 0.9 v	
White	Black	Results may vary, from 0.5v for older models to 1.8v for newer motors, or O/L.	
Black	White	0.4 - 0.6 v	

*Fan motor location on control PCB





EXPANSION VALVE COIL TESTING: The expansion valve coil is a DC energized coil, the coil is tested using resistance. There are 2 types of expansion coils 12v and 24v.

*Expansion Valve Coil test

Red Lead	Black Lead	Normal/Expected Readings	
		12v EEV Coil	24v EEV Coil
RED	WHITE	42 50 Q at 20c	183-191 Ω at 200
RED	ORANGE	42-50 Q at 20c	183-191 Ω at 200
RED OR BROWN (6 WIRE)	YELLOW	42-50 Q at 20c	183-191 Ω at 200
RED OR BROWN (6 WIRE)	BLUE	42-50 Ω at 20c	183-191 Ω at 200

*Expansion Valve Coil location on control PCB



*If you find that either the fan motor or expansion valve coil are faulty you can check to see if the control PCB is still useable by leave the faulty component of the control PCB and doing the communication test on the outdoor side of the system, there is a chance that the faulty component hasn't taken the control PCB with it.

For further assistance in fault finding please call Fujitsu General Assist tech support on 1300 364 484

