SYNC1320 Troubleshooting by Fault Code

January 27, 2006

Code	Name	Type	Meaning	Hints
343	**Hardware Failure**	Warning	At least, one of the following faults is active : ▪ Fault 2416 : Calibration Checksum Warning. ▪ Fault 353 : EEPROM Write Failure Warning. ▪ Fault 1335 : Utility Main AC Metering Failure ,and/or Genset Main AC Metering failure. ▪ Hardware version is not compatible with software version.	▪ Identify which of those four faults is active by looking at displayed information on LED`s located on the MCM3320 Board and/or by using InPower. ▪ See Troubleshooting hints for active specific fault (s) elsewhere in this same document. ▪ Cycle power to MCM3320. ▪ Perform an Initial Calibration or an Update Calibration. ▪ If these procedures do not resolve the problem, board must be replaced.
353	**EEPROM Write Error**	Warning	Current value in RAM memory (to-be-written value) and its post-written value in EEPROM are different.	▪ This happens every time you try to save a trim by using either InPower or LCD Display, and it is not successful. It could happen too when MCM3320 tries to automatically save data in a periodic basis. ▪ This fault can only be cleared by cycling power to MCM3320, or by resetting the processor via Inpower Initial calibration, or Update Calibration.
1222	**Not In Auto**	Event	Breaker Control or Synchronizing System is not in AUTO mode.	▪ Make sure you want to work in these conditions. If you do not , check relevant block terminals (TB10-6) or Modbus register on MCM3320 and related switches for misoperation. ▪ Check cabling from switches to these block terminals. ▪ Make sure control-switch mechanical operation is OK. ▪ Verify that MCM 3320 is properly processing contact data , via InPower.
1223	**Utility Bus Frequency**	Warning	Utility Frequency is greater than	▪ Check that Lower and Upper Utility-Frequency Drop-Out

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			Upper Drop-Out threshold or it is less than Lower Drop-Out threshold and it stays there for a time period greater than Drop-out Delay.	settings on MCM3320 create a sensible bandwidth that tells how good Utility is, in order to know whether or not you are trying to synchronize to a dependable source . Use InPower. ▪ Make sure Utility frequency is not varying a lot all the time because this will make synchronizing operation lengthy. ▪ Make sure MCM3320 is measuring frequency correctly. ▪ Check for very excessive harmonics contents in Utility voltage signal.
1224	**Genset Bus Over Voltage**	Warning	Genset Bus voltage is greater than Overvoltage Drop-Out Threshold and it stays there for a time period greater than Drop-Out Delay.	▪ Make sure Genset Overvoltage Threshold is safe for connected load. ▪ Check this value is not too much close to rated voltage. ▪ Make sure Time Delay for this fault is not too low. ▪ Check AVR system operation at each individual genset. ▪ Make sure all AC voltage sensors are properly calibrated at MCM3320, and at every Genset. ▪ Use InPower to monitor if signal is properly processed, and make adjustments. ▪ Check PT`s connections, and actual PT voltage ratio, if used.
1225	**Genset Bus Under Voltage**	Warning	Genset Bus voltage is less than Undervoltage Drop-Out Threshold and it stays there for a time period greater than Drop-Out Delay.	▪ Make sure Genset Undervoltage Threshold is safe for connected load. ▪ Check this value is not too much close to rated voltage. ▪ Make sure Time Delay setting , for this fault, is not too low. ▪ Check AVR system operation at each individual genset. ▪ Make sure all AC voltage sensors are properly calibrated at MCM3320 and Gensets. ▪ Use InPower to monitor if signals are properly processed , and make adjustments. ▪ Check for wire size , distance and loose connections. ▪ Check PT`s connections, and actual PT voltage ratio, if used.
1226	**Genset Bus Frequency**	Warning	Genset Bus Frequency is greater than	▪ Check that Lower and Upper GM Frequency Drop-Out

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			Upper Drop-Out threshold or it is less than Lower Drop-Out threshold and it stays there for a time period greater than Drop-out Delay.	settings on MCM3320 create a sensible bandwidth that makes load-feeding a safe activity. Use InPower. ▪ Be aware that the latter settings harmonize with gensets`s settings. ▪ Make sure Utility frequency is not varying a lot all the time because this will make synchronizing operation lengthy. ▪ Make sure MCM3320 is measuring frequency correctly. ▪ Check that Gensets`s control is well calibrated. ▪ Verify that frequency-governing system in each genset is properly set and is operating correctly. ▪ Check fuel quality, and fuel filters status at motor. ▪ Check for very excessive harmonics contents.
1335	**AC Metering Out Of Range**	Warning	At least one of the following variables are out of range in UM and/or GM analog AC measurements: Voltage , Current , KW , KVAR, KVA ,and Power Factor.	▪ You have to determine which one is the source in trouble: GM or UM. Use InPower. ▪ Make sure meter calibration is OK. ▪ Check PT`s and CT`s ratios are well set in MCM3320. ▪ Verify that PT`s and CT`s rated values match the ones set in MCM3320. ▪ Check numbers of turns on each one of built-in CTs to comply with requirements regarding 5A-secondary and 1A-secondary. ▪ Verify that CT`s and PT`s polarities and connections are OK. ▪ Make sure signal values at MCM3320 voltage-and-current inputs are not too high to prevent these inputs from clamping due to saturation. In general , 25 % above rated set value is a good reference point for maximum input value. Use InPower and an external meter to check. ▪ Maximum readable power is 32,767 kW/kVAR.
1456	**Synchronizer Output Limit**	Warning	Synchronizer has been trying to get match point by putting voltage and/or frequency at extreme values (lowest ,	▪ Check that Fail To Synchronize Time is not too low. ▪ Verify that Permissive Phase Window is not too low. ▪ Make sure Permissive Voltage Window is not too low.

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			highest) of allowed bandwidth for a time period greater than Fail-To-Synchronize Time , without achieving this match point.	▪ Check Permissive Window Time is not too high. ▪ Check Voltage Bias Signal is properly received by genset (s). Check wiring. ▪ Make sure Frequency Bias Signal is properly received by genset (s). Check wiring. ▪ Check that Genset speed-governing system is responsive to bias incoming signal. ▪ Check that AVR system is responsive to bias incoming signal. ▪ Check fuel quality. ▪ Make sure all meters are calibrated in MCM3320 and in each genset. ▪ Increase kW and/or kVAR Load Share Gain on Genset controllers. This will increase synchronizer range. Do not increase too much, or load sharing instability may result. ▪ Increase Upper and Lower Match Range Limits using InPower. Consult factory for detailed instructions or undesirable operation may result.
1457	**Fail To Synchronize**	Warning	It shows up when Synchronizer is active (Synchronizer is On) AND Sync Check OK has not occurred AND this is true continuously for Fail To Synchronize Time.	▪ Check voltage-bias and frequency-bias signal to gensets are arriving to correct ports. ▪ Check MCM3320 is sending bias signals to Gensets. ▪ Check gensets are responsive to these signals. ▪ Check speed-governing system of each genset. ▪ Check AVR system of each genset. ▪ Check fuel quality. ▪ Make sure all MCM3320`s and gensets`s meters are calibrated. ▪ See Hints for 1456.
1458	**Synchronizer Phase Rotation**	Warning	It shows up when Synchronizer is On **AND** Utility Phase Rotation is different from Genset Phase Rotation	▪ Use InPower to see data processing on MCM3320. ▪ Verify that Genset and Utility input voltage lines to MCM3320 match the ones shown on terminal block, as to

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	Mismatch		and this status is true continuously for Fail to Synchronize Time. Sync Check will not be possible until this is corrected.	Phase Rotation and line-to-line match. ▪ Be sure your Genset and Utility power lines are properly connected to relevant breakers. ▪ Check Genset`s and Utility`s PTs connections and polarities, if used . ▪ Verify your phase-sequence settings are consistent.
1483	**Common Warning**	Event	Active if any Warning fault state is active.	Search for the active Warning and follow relevant troubleshooting, elsewhere in this document.
1912	**Utility Bus Loss Of Phase**	Warning	It shows up if the phase difference in electrical degrees between adjacent-phase Utility Bus voltage phasors are greater than 150 degrees OR less than 90 degrees AND this is true continuously for Utility Loss of Phase Drop-Out Delay.	▪ Check for open phase(s). ▪ Check there is no incoming missing line at MCM3320 relevant Utility voltage inputs. ▪ Be sure connections are not loose. ▪ It is little probable that there is a real phase difference in Utility voltage phasors . Focus on loose connections and / or missing signals.
1913	**Genset Bus Loss Of Phase**	Warning	It shows up if the phase difference in electrical degrees between adjacent-phase Genset Bus voltage phasors are greater than 150 degrees OR less than 90 degrees AND this is true continuously for Utility Loss of Phase Drop-Out Delay.	▪ Check for open phase(s). ▪ Check there is no incoming missing line at MCM3320 relevant GM voltage inputs. ▪ Be sure connections are not loose. ▪ It is little probable that there is a real phase difference in GM voltage phasors . Focus on bad connections and / or missing signals.
1914	**Utility Bus Phase Rotation**	Warning	It shows up if Utility Phase Rotation mismatches System Phase Rotation setting for at least one second. THIS CONDITION IS ONLY CHECKED ON POWERUP OF THE CONTROL.	▪ Use InPower to verify data processing on MCM3320. ▪ Check System Phase Rotation setting in InPower Menu. ▪ Verify that Utility input voltage lines to MCM3320 match the ones shown on terminal block , as to Phase Rotation and line-to-line match. ▪ Be sure your Genset`s and Utility`s power lines are properly connected to relevant breakers. Not having this done could

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				mean a catastrophic breaker closure. ▪ Check Genset`s and Utility`s PTs connections and polarities, if used .
1915	**Genset Bus Phase Rotation**	Warning	It shows up if GenBus Phase Rotation mismatches System Phase Rotation for at least one second. THIS CONDITION IS ONLY CHECKED ON POWERUP OF THE CONTROL.	▪ Use InPower to verify data processing on MCM3320. ▪ Check System Phase Rotation setting in InPower Menu. ▪ Verify that Genset input voltage lines to MCM3320 match the ones shown on terminal block, as to Phase Rotation and line-to-line match. ▪ Be sure your Genset`s and Utility`s power lines are properly connected to relevant breakers. Not having this done could mean a catastrophic breaker closure. ▪ Check Genset`s and Utility`s PTs connections and polarities, if used .
1916	**Sync Check OK**	Event	It is active when Synch Check Close Allowed is active.	▪ This event is for information purpose. ▪ You could map this Event to a programmable output.
2328	**Utility Bus Available**	Event	(**UMGM or UMGX** topologies) : It appears, if below faults/events are inactive **simultaneously** . If its sensor is disable, Fault will be considered inactive . -Fault 2331 : Utility Undervoltage Warning. -Fault 2358 : Utility Overvoltage Warning . -Fault 1223 : Utility Frequency Warning . -Fault 1912 : Utility Loss of Phase Warning . -Fault 1914 : Utility Phase Rotation	▪ It is for information purposes only. ▪ This message can be mapped to an output.

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			Warning -Fault 1219 : Utility Breaker Tripped Warning. -Fault 1455 : Utility Breaker Position Contact Warning . -Fault 2396 : Utility Breaker Fail To Close Warning . -Utility Source Failure Switch Input is inactive . (**Master Synchronizer Only--MSO**) : It appears, if below faults/events are inactive **simultaneously** . If its sensor is disable, Fault will be considered inactive . -Fault 2331 : Utility Undervoltage Warning. -Fault 2358 : Utility Overvoltage Warning . -Fault 1223 : Utility Frequency Warning . -Fault 1912 : Utility Loss of Phase Warning . -Fault 1914 : Utility Phase Rotation Warning.	
2331	**Utility Bus Under Voltage**	Warning	Utility Bus voltage is less than Undervoltage Drop-Out Threshold and it stays there for a time period greater than Drop-Out Delay.	▪ Make sure Utility Undervoltage Threshold is safe for connected load. ▪ Check this value is not too much close to rated voltage. ▪ Make sure Time Delay for this fault is not too low.

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				▪ Make sure all AC voltage sensors are properly calibrated at MCM3320 and Utiity. ▪ Use InPower to monitor and make adjustments. ▪ Check for loose connections .
2358	**Utility Bus Over Voltage**	Warning	Utility Bus voltage is greater than Utility Overvoltage Drop-Out Threshold and it stays there for a time period greater than Drop-Out Delay.	▪ Make sure Utility Overvoltage Threshold is safe for connected load. ▪ Check this value is not too much close to rated voltage. ▪ Make sure Time Delay for this fault is not too low. ▪ Make sure all AC voltage sensors are properly calibrated in MCM3320. ▪ Use InPower to monitor and make adjustments. ▪ Check PTs connections and their ratio , if used.
2416	**Calibration Checksum Error**	Warning	It pops up when there is a specific mismatch regarding comparison of some internal data on the microprocessor.	▪ You must cycle power to the MCM3320. ▪ If fault persists , make an Initial Calibration by using InPower . ▪ If problem continues , change the board.
2965	**Genset Bus Available**	Event	(**GM or UMGM**) : It appears if below faults and event are inactive **simultaneously.** If its sensor is disable , Fault will be considered inactive . - Fault 1328 : GM Breaker Tripped Warning. - Fault 1452 : GM Breaker Fail-To-Close Warning. - Fault 1225 : GM Undervoltage Warning. - Fault 1224 : GM Overvoltage Warning.	▪ It is for information purposes only. ▪ This message can be mapped to an output.

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			- Fault 1226 : GM Frequency Warning. - Fault 1913 : GM Loss-Of-Phase Warning. - Fault 1915 ; GM Phase Rotation Warning . - Fault 1454 : GM Breaker Position Contact Warning. - Genset **Online Capacity** sensor must be picked up , or disable. (**GX or UMGX**) : It appears if below faults and event are inactive **simultaneously.** If its sensor is disable , Fault will be considered inactive . - Fault 1328 : Gen Breaker Tripped Warning. - Fault 1452 : Gen Breaker Fail-To-Close Warning. - Gensets Stop Command must be inactive and Gen CB could be opened or closed. - Fault 1225 : Gen Main Undervoltage Warning. - Fault 1224 : Gen Main Overvoltage Warning. - Fault 1226 : Gen Main Frequency Warning. - Fault 1913 : Gen Main Loss-Of-	

Code	Name	Type	Meaning	Hints
			Phase Warning. - Fault 1915 : Gen Main Phase Rotation Warning. (**Master Syncronizer Only -- MSO**) : It appears if below faults and event are inactive **simultaneously.** If its sensor is disable, Fault will be considered inactive . - Fault 1225 : Gen Main Undervoltage Warning. - Fault 1224 : GM Overvoltage Warning. - Fault 1226 : GM Frequency Warning. - Fault 1913 : GM Loss-Of-Phase Warning. - Fault 1915 : Gen Main Phase Rotation Warning. - Genset **Online Capacity** sensor must be picked up , or disable.	