

AMF5.2 FAILURES

The alarm list can be accessed by pressing the Menu Button for 3 seconds while on the home page and using the Up and Down Buttons in order to navigate to the Alarm List and pressing the Menu Button to enter the list. Many of the failures have a structure similar to the example below. Table 1 will be used as an example.

Parameter Number	Parameter Name	Range	Default Value
P216	Generator Under Frequency Level 1 Failure Alarm Active	0: Passive 1: Active	1: Active
P217	Generator Under Frequency Level 1 Failure Value	10.0 –75.0 hz	47.0 hz
P218	Generator Under Frequency Level 1 Failure Delay	2-20 sec	5 sec
P219	Generator Under Frequency Level 1 Failure Return Time	2-20 sec	5 sec
P220	Generator Under Frequency Level 1 Failure Class	1 - 6	Class 2
P221	Generator Under Frequency Level 1 Failure Auto-acknowledge	0: Passive 1: Active	0: Passive
P222	Generator Under Frequency Level 1 Failure Auto-acknowledge Type	0: Limited 1: Unlimited	0: Limited
P223	Generator Under Frequency Level 1 Failure Auto-acknowledge Number	2-99	3
P224	Generator Under Frequency Level 1 Failure Hysteresis Value	0.1-20 hz	1.0
P225	Generator Under Frequency Level 1 Failure Auto-acknowledge Counter	0-30000	0
P226	Generator Under Frequency Level 1 Failure Auto-acknowledge Counter Decrease Time	0.1 – 6500.0 hours	10.0

Table 1 : Sample Failure Paramter Table

Table 1 shows the parameters related to Generator Under Frequency Level 1 Failure. Most of the other failures have the same structure.

If the failure active parameter (P216) is set to 1: Active, if the related failure conditions appear, the panel will indicate an alarm. If selected as 0: Passive, even though the related failure conditions appear, the unit will not indicate an alarm.

The criteria regarding the failure is set on the next parameter P217. The value on Table 1 indicates 47.0 Hz. If the Generator frequency drops below 47 Hz, the panel will indicate an alarm after waiting for the delay set by the next parameter P218.

After the failure occurs, in order to remove the alarm from the panel, the conditions creating the alarm must be removed and the time period set by P219 must have elapsed.

The failures are classified in 6 classes.

Class 1: Only for warning purposes. Only the alarm will be indicated on the panel.

Class 2: Besides indicating the alarm on the panel, the horn output will also be energized.

Class 3: Alarm indication on front panel, horn output energized and the Generator contactor will be de-energized and the Load will not be fed by the Genrator.

Class 4: Alarm indication on front panel, horn output energized, Generator contactor de-energized and the engine will be stopped after cool down.

Class 5: Alarm indication on front panel, horn output energized, Generator contactor de-energized and the engine will be stopped immediately without cooling down.

Class 6: Alarm indication on front panel, horn output energized, Generator contactor de-energized, engine will be stopped immediately without cooling down and the Mains contactor will be de-energized.

The Auto-acknowledge parameter P221 will automatically acknowledge the alarm. Once the number of acknowledged alarms reach the parameter set by P223, the unit will NOT auto-acknowledge any more alarms. In the case where the failure has occurred, but has not repeated within the time period set by the parameter P226, the Auto-acknowledge Counter (P225) will be decreased by 1. If the Auto-acknowledge Type (P222) is chosen as 1: Unlimited, the Auto-acknowledge operation will be done with no limits.

Under Frequency Level 1 and 2: If the Alternator under frequency failure parameters, for level 1 P216-P226 and for level 2 P227-P237, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “LOW FREQUENCY LEVEL 1” or “LOW FREQUENCY LEVEL 2”.

Under RPM Level 1 and 2: The settings regarding the magnetic pick-up can be made using parameters P86 and P87. If the under RPM failure parameters, for level 1 P260-P270 and for level 2 P270-P280, are set in the same logic as explained above and the conditions for a failure are present (The RPM can be measured from Alternator Frequency, Magnetic Pick-up or ECU), this failure will occur. The display will indicate “LOW REVOLUTION LEV. 1” or “LOW REVOLUTION LEV. 2”.

Over Frequency Level 1 and 2: If the Alternator over frequency failure parameters, for level 1 P238-P248 and for level 2 P249-P259, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “HIGH FREQUEN. LEVEL 1” or “HIGH FREQUEN. LEVEL 2”.

Over RPM Level 1 and 2: The settings regarding the magnetic pick-up can be made using parameters P86 and P87. If the over RPM failure parameters, for level 1 P282-P292 and for level 2 P293-P303, are set in the same logic as explained above and the conditions for a failure are present (The RPM can be measured from Alternator Frequency, Magnetic Pick-up or ECU), this failure will occur. The display will indicate “HIGH REVOLUTION LV. 1” or “HIGH REVOLUTION LV. 2”.

Under Voltage Level 1 and 2: If the Alternator under voltage failure parameters, for level 1 P172-P182 and for level 2 P183-P193, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “LOW VOLTAGE LEVEL 1” or “LOW VOLTAGE LEVEL 2”.

Over Voltage Level 1 and 2: If the Alternator over voltage failure parameters, for level 1 P194-P204 and for level 2 P205-P215, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “HIGH VOLTAGE LEVEL 1” or “HIGH VOLTAGE LEVEL 2”.

RPM Sensor Failure: In the case where P86 is =1, the engine is running (cranking, failure delay, running or cooldown), the measured RPM drops below the value set by P131 and the parameters related to engine RPM sensor (P304-312) are set in the same logic as explained above this failure will occur. The display will indicate “REVOL. SENSOR FAILURE”.

Charge Voltage Failure Level 1 and 2: In the case where P313 is =1 and the charge Alternator failure parameters, for level 1 P314-P324 and for level 2 P325-335, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “CHARGE FAILURE LEV 1” or “CHARGE FAILURE LEV 2”.

Battery Under Voltage Failure Level 1 and 2: If the battery under voltage failure parameters, for level 1 P336-P346 and for level 2 P347-P348, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “LOW BAT. VOLTAGE LV. 1” or “LOW BAT. VOLTAGE LV. 2”.

Battery Over Voltage Failure Level 1 and 2: If the battery over voltage failure parameters, for level 1 P358-P368 and for level 2 P369-P379, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “HIGH BAT. VOLTAGE L. 1” or “HIGH BAT. VOLTAGE L. 2”.

MCB Contactor Fail to Open: While the AMF is on waiting to open the Mains contactor and the feedback for the Mains contactor is active (at least one of the digital inputs has been set to 15 or 16) and the correct signal has not been received from the feedback and if the parameters P380-P388 are set in the same logic as explained above, this failure will occur. The display will indicate “MAINS CONT. OPEN FAIL”.

MCB Contactor Fail to Close: While the AMF is on waiting to close the Mains contactor and the feedback for the Mains contactor is active (at least one of the digital inputs has been set to 15 or 16) and the correct signal has not been received from the feedback and if the parameters P389-P397 are set in the same logic as explained above, this failure will occur. The display will indicate “MAINS CON. CLOSE FAIL”.

MCB Contactor State Unknown Failure: In the case where both feedbacks for the MCB are active (Two of the digital inputs are assigned 15 and 16), and the feedbacks are sending conflicting signals (both contactor open and contactor closed feedbacks are 0 or 1), and if the parameters P398-P406 are set in the same logic as explained above, this failure will occur. The display will indicate “MAINS CONT. UNDEFINED”.

GCB Contactor Fail to Open: While the AMF is on waiting to open the Generator contactor and the feedback for the Generator contactor is active (at least one of the digital inputs has been set to 13 or 14) and the correct signal has not been received from the feedback and if the parameters P407-P415 are set in the same logic as explained above, this failure will occur. The display will indicate “GEN. CONT. OPEN FAIL”.

GCB Contactor Fail to Close: While the AMF is on waiting to close the Generator contactor and the feedback for the Generator contactor is active (at least one of the digital inputs has been set to 13 or 14) and the correct signal has not been received from the feedback and if the parameters P416-P424 are set in the same logic as explained above, this failure will occur. The display will indicate “GEN CONT. CLOSE FAIL”.

GCB Contactor State Unknown Failure: In the case where both feedbacks for the GCB are active (Two of the digital inputs are assigned 13 and 14), and the feedbacks are sending conflicting signals (both contactor open and contactor closed feedbacks are 0 or 1), and if the parameters P425-P433 are set in the same logic as explained above, this failure will occur. The display will indicate “GEN. CONT. UNDEFINED”.

Over Current Failure Level 1, 2 and 3 : If parameters for level 1 P434-P444, for level 2 P445-P455 and for level 3 P456-P466 are set in the same logic as explained above while for single phase systems R phase current, for two or three phase systems R and S phase current, and for three phase systems R, S and T phase current values are creating conditions for a failure, this failure will occur. The display will indicate “OVERCURRENT LEVEL 1” or “OVERCURRENT LEVEL 2” or “OVERCURRENT LEVEL3”.

KW Failure Level 1 and 2: If parameters for level 1 P467-P477 and for level 2 P478-P488 are set in the same logic as explained above while for single phase systems R phase active power, for two or three phase systems R and S phase active power, and for three phase systems R, S and T phase active power values are creating conditions for a failure, this failure will occur. The display will indicate “KILOWATT FAILURE 1” or “KILOWATT FAILURE 2”.

KVar Failure Level 1 and 2: If parameters for level 1 P489-P499 and for level 2 P500-P510 are set in the same logic as explained above while for single phase systems R phase reactive power, for two or three phase systems R and S phase reactive power, and for three phase systems R, S and T phase reactive power values are creating conditions for a failure, this failure will occur. The display will indicate “KILOVAR FAILURE 1” or “KILOVAR FAILURE 2”.

KVA Failure Level 1 and 2: If parameters for level 1 P511-P521 and for level 2 P522-P532 are set in the same logic as explained above while for single phase systems R phase power, for two or three phase systems R and S phase power, and for three phase systems R, S and T phase power values are creating conditions for a failure, this failure will occur. The display will indicate “KILOVA FAILURE 1” or “KILOVA FAILURE 2”.

Power Factor Failure Level 1 and 2: If parameters for level 1 P533-P543 and for level 2 P544-P554 are set in the same logic as explained above while for single phase systems R phase power factor, for two or three phase systems R and S phase power factor, and for three phase systems R, S and T phase power factor values are creating conditions for a failure, this failure will occur. The display will indicate “COSFI FAILURE 1” or “COSFI FAILURE 2”.

Oil Pressure Switch Failure: The oil pressure switch input must be activated via parameter P572 and the right contact type (Normally Open/Normally Closed) must be set using parameter P573. If the status of the digital input is inverse to the contact type and the parameters P574-P582 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “OIL SWITCH FAILURE”.

Analog Low Oil Pressure Failure Level 1 and 2: If the analog oil pressure failure parameters, for level 1 P596-P606 and for level 2 P607-P617, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “ANALOG OIL FAIL 1” or “ANALOG OIL FAIL 2”.

Analog Oil Pressure Sensor Failure: If P619 is set as low level, and the ADC value read by the microprocessor has dropped below the value determined by P1415, and parameters P618-P627 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. If parameter P619 is set as high level, and the ADC value read by the microprocessor has gone above the value determined by P1416, and parameters P618-P627 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. In the case where P619 has been set as both high level and low level, the failure conditions will have appeared when the ADC value is outside the limits set by P1415 and P1416. In any case the display will indicate “ANALOG OIL SENS. FAIL”.

Water Temperature Switch Failure: The water pressure switch input must be activated via parameter P583 and the right contact type (Normally Open/Normally Closed) must be set using parameter P584. If the status of the digital input is inverse to the contact type and the parameters P585-P593 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “TEMP. SWITCH FAILURE”.

Analog High Water Temperature Failure Level 1 and 2: If the analog water temperature failure parameters, for level 1 P683-P693 and for level 2 P694-P704, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “HIGH TEMP. FAIL 1” or “HIGH TEMP. FAIL 2”.

Analog Low Water Temperature Failure Level 1 and 2: If the analog water temperature failure parameters, for level 1 P705-P715 and for level 2 P716-P726, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “LOW TEMP. FAIL 1” or “LOW TEMP. FAIL 2”.

Analog Water Temperature Sensor Failure: If P728 is set as low level, and the ADC value read by the microprocessor has dropped below the value determined by P1418, and parameters P727-P736 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. If parameter P728 is set as high level, and the ADC value read by the microprocessor has gone above the value determined by P1419, and parameters P727-P736 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. In the case where P728 has been set as both high level and low level, the failure conditions will have appeared when the ADC value is outside the limits set by P1418 and P1419. In any case the display will indicate “ANALOG TEMP. SEN. FAIL”.

Analog Low Fuel Level Failure Level 1 and 2: If the analog fuel level failure parameters, for level 1 P791-P801 and for level 2 P802-P812, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “LOW FUEL FAIL 1” or “LOW FUEL FAIL 2”.

Fuel Consumption while Stopped Failure: If the analog standby fuel consumption failure parameters P813-P823 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “STOPPED HIGH FUEL”.

High Fuel Consumption while Running Failure: If the high fuel consumption while running failure parameters P824-P834 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “RUNNING HIGH FUEL”.

Analog Fuel Level Sensor Failure: If P836 is set as low level, and the ADC value read by the microprocessor has dropped below the value determined by P1421, and parameters P835-P844 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. If parameter P836 is set as high level, and the ADC value read by the microprocessor has gone above the value determined by P1422, and parameters P835-P844 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. In the case where P836 has been set as both high level and low level, the failure conditions will have appeared when the ADC value is outside the limits set by P1421 and P1422. In any case the display will indicate “FUEL SENSOR FAILURE”.

Fuel Refill Failure Level 1 and 2: If the analog fuel level failure parameters, for level 1 P850-P861 and for level 2 P862-P873, are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “FUEL FILLING FAIL 1” or “FUEL FILLING FAIL 2”.

Digital Input 1 Failure: If P927 is set to 1 and Digital Input 1 parameters P928-P940 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 1 FAIL.” however this text string can be customized via P938-P940.

Digital Input 2 Failure: If P941 is set to 1 and Digital Input 2 parameters P942-P954 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 2 FAIL.” however this text string can be customized via P952-P954.


Digital Input 3 Failure: If P955 is set to 1 and Digital Input 3 parameters P956-P968 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 3 FAIL.” however this text string can be customized via P966-P968.

Digital Input 4 Failure: If P969 is set to 1 and Digital Input 4 parameters P970-P982 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 4 FAIL.” however this text string can be customized via P980-P982.


Digital Input 5 Failure: If P983 is set to 1 and Digital Input 5 parameters P984-P996 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 5 FAIL.” however this text string can be customized via P994-P996.

Digital Input 6 Failure: If P997 is set to 1 and Digital Input 6 parameters P998-P1010 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 6 FAIL.” however this text string can be customized via P1008-P1010.


Digital Input 7 Failure: If P1015 is set to 1 and Digital Input 7 parameters P1016-P1028 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 7 FAIL.” however this text string can be customized via P1026-P1028.

 **Caution:** In order for the Digital Input 7 Failure to occur, the *Can88 I/O Extention Module* must be connected over the canbus


Digital Input 8 Failure: If P1029 is set to 1 and Digital Input 8 parameters P1030-P1042 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 8 FAIL.” however this text string can be customized via P1040-P1042.

 **Caution:** *In order for the Digital Input 8 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 9 Failure: If P1043 is set to 1 and Digital Input 9 parameters P1044-P1056 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 9 FAIL.” however this text string can be customized via P1054-P1056.

 **Caution:** *In order for the Digital Input 9 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 10 Failure: If P1057 is set to 1 and Digital Input 10 parameters P1058-P1070 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 10 FAIL.” however this text string can be customized via P1068-P1070.

 **Caution:** *In order for the Digital Input 10 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 11 Failure: If P1071 is set to 1 and Digital Input 11 parameters P1072-P1084 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 11 FAIL.” however this text string can be customized via P1082-P1084.

 **Caution:** *In order for the Digital Input 11 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 12 Failure: If P1085 is set to 1 and Digital Input 12 parameters P1086-P1098 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 12 FAIL.” however this text string can be customized via P1096-P1098.

 **Caution:** *In order for the Digital Input 12 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 13 Failure: If P1099 is set to 1 and Digital Input 13 parameters P1100-P1112 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 13 FAIL.” however this text string can be customized via P1110-P1112.

 **Caution:** *In order for the Digital Input 13 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Digital Input 14 Failure: If P1113 is set to 1 and Digital Input 14 parameters P1114-P1126 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AUX. INPUT 13 FAIL.” however this text string can be customized via P1124-P1126.

 **Caution:** *In order for the Digital Input 14 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*

AN0 Failure: If the AN0 Analog Input which is located on the Can88 I/O Extention Module parameters P1263-P1275 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AN0 ANALOG FAILURE”

 **Caution:** *In order for the AN0 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*

AN1 Failure: If the AN1 Analog Input which is located on the Can88 I/O Extention Module parameters P1276-P1287 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “AN1 ANALOG FAILURE”

 **Caution:** *In order for the AN1 Failure to occur, the Can88 I/O Extention Module must be connected over the canbus*


Earth Current Failure: If the earth current input (*Ie Terminal*) failure failure parameters P1427-P1443 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “EARTH FAULT”.

Reverse Power Protection Failure: If the power reading on any one of the phases drop below the set limit, and the reverse power protection failure parameters P1444-P1455 are set in the same logic as explained above and the conditions for a failure are present, this failure will occur. The display will indicate “REVERSE POWER ERROR”.

Periodic Engine Maintenance Timer: On the AMF 5.2 there are 6 programmable engine maintenance timers. These timers can be programmed via parameters P31-P54. After maintenance, the user can reset the Elapsed Time through the respective parameter in order to keep the accurate maintenance time. The display will indicate “MOTOR MAINTENAN.”

 **Info:** *P30 will reset all the Periodic Maintenance Timers*

Periodic Maintenance Timer: On the AMF 5.2 there are 6 programable maintenance timers. These timers can be programmed via parameters P55-P78. After maintenance, the user can reset the Elapsed Time through the respective parameter in order to keep accurate maintenance time. The display will indicate “PERIOD. MAINTENAN.”.

 **Info:** *P30 will reset all the Periodic Maintenance Timers*

Generator Start Failure: After attempting a certain number of cranks, if the Generator has failed to start, this failure will occur. The settings for this failure can be done via parameters P561-P565. The display will indicate “NOT STARTING FAILURE”.

Generator Self-start Failure: In the case where the Generator has been started through an external source other than the AMF5.2, and the AMF5.2 receives a start command while the engine is already running, this failure will occur. The settings for this failure can be done via parameters P555-P560. The display will indicate “SELF STARTING FAIL”.

Generator Stop Failure: After the AMF5.2 begins the Generator stop process and the Generator does not stop for a certain time period, this failure will occur. The settings for this failure can be done via parameters P566-P571. The display will indicate “FAIL TO STOP”

EEProm Failure: In the case of this **highly critical error** the screen will indicate “EEP”. In this case the qualified service must be contacted and the **panel must definitely NOT be operated.**

Phase Sequence Error: If there is any sequence mistake in the connections of the Mains R,S,T or Generator U,V,W phases, this failure will occur. The settings for this failure can be done through parameters P1456 and P1457.

Engine Control Unit (ECU) Failure: In the case of this failure, the AMF5.2 does NOT save it on the internal memory, but rather only indicate the failure on its display. This failure will occur if a failure on the ECU occurs. The table below shows some common Suspect Parameter Number's (SPN) and Failure Mode Indicator's (FMI). This information may vary among different ECU brands and models.


SPN	Description
94	Fuel distribution pressure sensor or value failure
98	High/low oil level or oil level sensor failure
100	Low oil pressure or oil pressure sensor failure
102	High turbo pressure
105	High intake manifold temperature
107	Air filter clogged
108	Atmosphere pressure sensor failure
110	Overheat
111	Low coolant level
164	High injector pressure or sensor failure
168	Battery voltage failure
172	High intake manifold air temperature or sensor failure
174	Fuel over heat or sensor failure
175	Oil over heat or sensor failure
190	Over speed, speed reading error or speed sensor failure
620	ECU internal +5V failure

- 651 Cylinder #1 injector failure
- 652 Cylinder #2 injector failure
- 653 Cylinder #3 injector failure
- 654 Cylinder #4 injector failure
- 655 Cylinder #5 injector failure
- 656 Cylinder #6 injector failure
- 657 Cylinder #7 injector failure
- 658 Cylinder #8 injector failure


FMI Description

- 0 The measured value is above the set limit
- 1 The measured value is below the set limit
- 2 Unstable or wrong information
- 3 Over voltage (Electrical Error)
- 4 Under voltage (Electrical Error)
- 5 Under current (Electrical Error)
- 6 Over current (Electrical Error)
- 7 Mechanical system error (Mechanical Error)
- 8 Abnormal frequency (Electrical or Mechanical Error)
- 9 Abnormal communication refresh rate
- 10 Abnormal large variations (Electrical or Mechanical Error)
- 11 Unknown failure
- 12 Device failure
- 13 Calibration values out of limits
- 15 Data valid but above normal operating range - least severe level
- 16 Data valid but above normal operating range - moderately severe level
- 17 Data valid but below normal operating range - least severe level
- 18 Data valid but below normal operating range - moderately severe level
- 19 Information received from source has errors
- 31 Error condition valid

Engine Control Unit Communication Failure: In the case of this failure, the AMF5.2 does NOT save it on the internal memory, but rather only indicate the failure on its display. If the AMF5.2 can not communicate with the ECU, this failure will occur.

 **Caution:** Please make sure related parameters P1012 and P1013 are set correctly in case of this failure.

I/O Extention Module Communication Failure: In the case of this failure, the AMF5.2 does NOT save it on the internal memory, but rather only indicate the failure on its display. If the AMF5.2 can not communicate with the I/O Extention Module, this failure will occur.

 **Caution:** Please make sure related parameters P1011 and P1014 are set correctly in case of this failure.