

## DS-350 Graphic Modular GM

### ERROR CODE TABLE

ERROR CODE	ERROR	CAUSE	ACTION
E01	Minimum radius or maximum angle range exceeded	Fallen below the minimum radius or above the angle given in the load chart due to raising the boom too far.	Lower boom back to a radius or angle given in the load chart.
E02	Maximum radius or minimum angle range exceeded	The maximum radius or minimum angle given in the load chart was exceeded due to lowering the boom too far.	Raise boom back to a radius or angle given in the load chart.
E03	Prohibited slewing range (no load area)	Slewing range prohibited with load.	Slew back into admissible range.
E04	Operating mode not available	Operating mode switch in the console set incorrectly. Operating mode is not permissible with actual crane configuration.	Set operating mode switch correctly to the code assigned to the operating mode of the crane.
E05	Length range not permitted	Boom has been extended too far or not far enough. Length sensor adjustment changed; i.e. length sensor cable slid off the cable drum.	Refer to Section 3.7. Retract or extend boom to correct length given in the load chart.
E06	Fallen below angle range with luffing jib operation.	Fallen below the minimum jib angle specified in the respective load chart due to luffing out the jib too far.	Luff in the jib to a radius or angle specified in the load chart.
E07	No acknowledgment signal from overload relay (K1).	Overload relay is stuck, defective or not being selected.	Replace main board in central unit. Refer to Drawing 4 and Procedure 3 in Section 5.3
E08	No acknowledgment signal from Anti-Two-Block switch relay (K2).	Anti-Two-Block switch relay is defective or not being selected.	Replace main board in central unit. Refer to Drawing 4, Section 4.4, and Procedure 3 in Section 5.3.
E10	Error in length measurement	With the boom fully retracted, the length differs by more than 2%.	Refer to Section 3.7.

ERROR CODE	ERROR	CAUSE	ACTION
E11	Fallen below limit for the measuring channel "length".	a.) Cable between length sensor and central unit defective, not connected or water in the connectors. b.)Length sensor Potentiometer defective. c.)Electronic board in the measuring channel defective.	Refer to Section 3.7 a.)Check cable and connector b.) Check and reset length sensor Potentiometer. Refer to Procedure 5. c.) Check signal on main board and analog input module.
E12	Fallen below lower limit value for the measuring channel "pressure transducer piston side".	a.) Cable leading from the central unit to the pressure transducer defective, loose or water in the connector. b.)Pressure transducer on piston side defective. c.)Electronic component in the measuring channel defective.	Refer to Section 3.9 a.)Check cable and connector b.)Check pressure transducer and reset pressure channel. c.) Check signal on main board and analog input module.
E13	Fallen below lower limit value for the measuring channel "pressure transducer rod side".	a.)Cable leading from the central unit to the pressure transducer defective, loose or water in the connector. b.)Pressure transducer on rod side defective. c.)Electronic component in the measuring channel defective.	Refer to Section 3.9 a.)Check cable and connector b.) Check pressure transducer and reset pressure channel. c.) Check signal on main board and analog input module.
E14	Fallen below lower limit value for the measuring channel "force".	a.)Cable leading from the central unit to the pressure transducer defective, loose or water in the connector. b.)Force transducer defective. c.)Electronic component in the measuring channel defective.	a.) Check cable and connectors as well and replace, if necessary. b.)Check force transducer. c.) Check signal on main board and analog input module.
E 15	Fallen below lower limit value for the measuring channel "angle main boom".	a.)Cable from central unit to the length/angle sensor defective or loose. b.)Angle sensor defective. c.)Electronic component in the measuring channel defective.	Refer to Section 3.8 a.) Check cable. b.) Check angle sensor and reset adjustment. Refer to Procedure 5 c.) Check signal on main board and analog input module.

ERROR CODE	ERROR	CAUSE	ACTION
E16	Fallen below lower limit value for measuring channel "Luffing Jib Angle".	a.)Cable from central unit to angle sensor defective or disconnected or water inside the plug. b.)Angle sensor defective. c.)Electronic component in the measuring channel defective.	a.) Check cable. b.) Check angle sensor and reset adjustment. c.) Check signal on main board and analog input module.
E17	Fallen below lower limit value for the measuring channel 7.	a.)Cable leading from the central unit to the sensor of channel 7 defective, loose or water in the connectors. b.)Sensor of channel 7 defective. c.)Electronic component in the measuring channel 7 defective.	a.) Check cable and connectors. b.) Check sensor of channel 7 and reset adjustment. c.) Check signal on main board and analog input module.
E18	Outrigger overloaded	Front outrigger overloaded	Check outrigger sensor
E19	Error in the reference voltage.	Electronic component on the main board defective.	Replace main board. Refer to Drawing 4 and Procedure 3.
E1A	Below limiting value for slewing angle 1.	a.)Cable from central unit to the slewing angle sensor defective or loose.	a.) Check cable.
E1B	Below limiting value for slewing angle 2.	b.)Slewing angle potentiometer defective. c.)Electronic component in the measuring channel defective on main board.	b.) Check and reset slewing angle potentiometer. c.) Check signal on main board and analog input module.
E21	Upper limiting value for the measuring channel "length" exceeded.	a.)Cable from central unit to the length/angle sensor defective or loose. b.)Length potentiometer defective. c.)Electronic component in the measuring channel defective on main board.	Refer to Section 3.7 a.) Check cable and connector b.) Check and reset length sensor Potentiometer. Refer to Procedure 5. c.) Check signal on main board and analog input module.

ERROR CODE	ERROR	CAUSE	ACTION
E22	Upper limiting value for the measuring channel “pressure piston side” exceeded.	a.)Cable from central unit to the pressure transducer defective, loose or water in the plug. b.)Pressure transducer on piston side defective. c.)Electronic component in the measuring channel defective on main board.	Refer to Section 3.9 a.) Check cable and connector b.) Check pressure transducer and reset pressure channel. c.) Check signal on main board and analog input module.
E23	Upper limit value for the measuring channel “pressure transducer rod side” exceeded.	a.) Cable lead in from the central unit to press trans defective, not connected or water in the connectors. b.) Pressure transducer on rod side defective. c.) Electronic component in the measuring channel defective.	Refer to Section 3.9 a.) Check cable and connector b.) Check pressure transducer and reset pressure channel. c.) Check signal on main board and analog input module.
E24	Upper limit value for the measuring channel “force” exceeded.	a.) Cable leading from the central unit to the force transducer defective, not connected or water in the connectors. b.) Force transducer defective. c.) Electric component in the measuring channel defective.	a.) Check cable and connectors as well and replace, if necessary. b.) Check force transducer. c.) Check signal on main board and analog input module.
E25	Upper limit value for the measuring channel “angle main boom” exceeded.	a.) Cable leading from the central unit to the length/angle sensor defective, loose or water in the connectors. b.) Angle sensor defective c.) Electronic component in the measuring channel defective.	Refer to Section 3.8 a.) Check cable. b.) Check angle sensor and reset adjustment. Refer to Procedure 5 c.) Check signal on main board and analog input module.
E26	Upper limit value for the measuring channel “Luffing Jib Angle” exceeded.	a.) Cable leading from the central unit to the jib angle sensor defective, loose or water in the connectors. b.) Jib angle sensor defective. c.) Electronic component in the measuring channel defective.	a.) Check cable. b.) Check angle sensor and reset adjustment. c.) Check signal on main board and analog input module.

ERROR CODE	ERROR	CAUSE	ACTION
E27	Upper limit value for the measuring channel 7 exceeded.	a.) Cable leading from the central unit to the sensor of channel 7 defective, loose or water in the connectors. b.) Sensor of channel 7 defective. c.) Electronic component in the measuring channel 7 defective.	a.) Check cable and connectors. b.) Check sensor of channel 7 and reset adjustment. c.) Check signal on main board and analog input module.
E29	Reference voltage defective.	a.) The total of the supply and the reference voltages on MP10 is more than 3.3V b.) A/D converter defective.	a.) Check supply voltages. b.) Replace main board or analog input module. Refer to Drawing 4 and Procedure 3 Steps 1,2,4, 11,12..
E2A	Above limiting value for slewing angle 1.	a.) Cable from central unit to the slewing angle sensor defective or loose.	a.) Check cable.
E2B	Above limiting value for slewing angle 2.	b.) Slewing angle potentiometer defective. c.) Electronic component in the measuring channel defective on main board.	b.) Check and reset slewing angle potentiometer. c.) Check signal on main board and analog input module.
E31	Error in the system program.	a.) EPROM with system program defective. b.) Electronic component on the main board defective.	a.) Replace system program EPROM b.) Check signal on main board and analog input module.
E37	Error in the program run	a.) EPROM with system program defective. b.) Electronic component on the main board defective.	a.) Replace system program EPROM. b.) Check signal on main board and analog input module.
E38	System program and Data EPROM do not match.	The system program in the LMI does not correspond to the programming in the data EPROM	Replace system program EPROM or Data EPROM. Refer to Procedure 2
E39	System program and TLK EPROM do not match.	The system program in the LMI does not correspond to the programming in the data EPROM	Replace system program EPROM or TLK EPROM. Refer to Procedure 2
E41	Error in the external RAM.	Defective electronic component.	Replace main board or analog input module. Refer to Drawing 4 and Procedure 3, Steps 1,2,4, 11, and 12.

ERROR CODE	ERROR	CAUSE	ACTION
E42	Error in the external write/read memory (RAM). Part 1	Internal defect in digital part of CPU.	Exchange write/read memory (CMOS-RAM). Replace CPU module. Refer to Drawing 4 and Procedure 3, Steps 1-3, 13,14.
E43	Error in the external write/read memory (RAM). Part 2.	Internal defect in digital part of CPU.	Exchange write/read memory (CMOS-RAM). Replace CPU module. Refer to Drawing 4 and Procedure 3, Steps 1-3, 13,14.
E45	Redundancy error in A/D conversion.	Defective electronic component.	Replace analog input module. Refer to Drawing 4 and Procedure 3, Steps 1,2,4, 11,12.
E46	Error in A/D conversion.	Defective electronic component.	Replace analog input module. Refer to Drawing 4 and Procedure 3 Steps 1,2,4, 11,12.
E47	Malfunction in the monitored write/read memory.	Internal defect in digital part of CPU	Replace CPU module. Refer to Drawing 4 and Procedure 3 Steps 1-3, 13,14
E48	Cyclic RAM test: Error in the internal write/read memory.	Internal defect in digital part of CPU	Replace CPU module. Refer to Drawing 4 and Procedure 3 Steps 1-3, 13,14
E51	Error in data EPROM.	EPROM Module not bridged correctly Data EPROM on the main board defective.	Replace Data EPROM. Make sure BR3 on the main board is installed. Refer to Procedure 2.
E52	Error in load chart EPROM.	EPROM Module not bridged correctly Data EPROM on the main board defective.	Replace EPROM Module and reset pressure channels. Refer to Drawing 4 and Procedure 4.
E56	Error in crane data EEPROM.	Memory module wrongly bridged. Crane data EEPROM defective	Bridge memory module acc. To memory type Replace crane data EEPROM Replace EPROM Module and reset pressure channels. Refer to Drawing 4 and Procedure 4.

ERROR CODE	ERROR	CAUSE	ACTION
E57	Error in serial crane data EEPROM.	Serial crane data EEPROM does not contain valid data.  Memory module defective	Write data on the serial crane data EEPROM (by means of test program or on-line function), then restart the LMI  Replace EPROM Module and reset pressure channels. Refer to Drawing 4 and Procedure 4.
E58	Error in the serial analog data EEPROM.	Invalid data in the serial analog data EEPROM.  LMI main board defective.	Write data on the serial analog data EEPROM by means of the test program, then, restart the LMI  Replace LMI main board.
E69	Error in the load chart EPROM The number of the selected EPROM base and the programmed value are not identical	Memory module wrongly bridged  Load chart EPROM defective	Bridge memory module acc. to memory type  Replace load chart EPROM
E70	Error in digital output module.	Central unit unable to correspond with digital output module.	a.) Check supply voltage. b.) Replace digital output module.
E71	Incorrect acknowledgment of the 1. Relay on the main board.	a.) Anti Two-block relay is stuck or defective. b.) Anti Two-Block relay is not being selected due to a break on the main board.	Replace main board. Refer to Drawing 4 and Procedure 3.
E72 – E77	Analogous to E71 for the relays 2...7.	Analogous to E71 for the relays 2...7.	Analogous to E71 for the relays 2..7.
E84	Wrong rigging condition.	The selected rigging condition is not contained in the data EPROM.	Select another rigging condition  Check the programming in the data EPROM.
E85	Error in the radius determination	The computed radius is too small (negative deflection)	Check the programming in the data EPROM.
E89	Change of the operating code during lifting a load.	The operating mode switch in the console was used during lifting a load.	Lower the load and set the operating mode switch correctly to the code assigned to the actual operating mode of the crane.

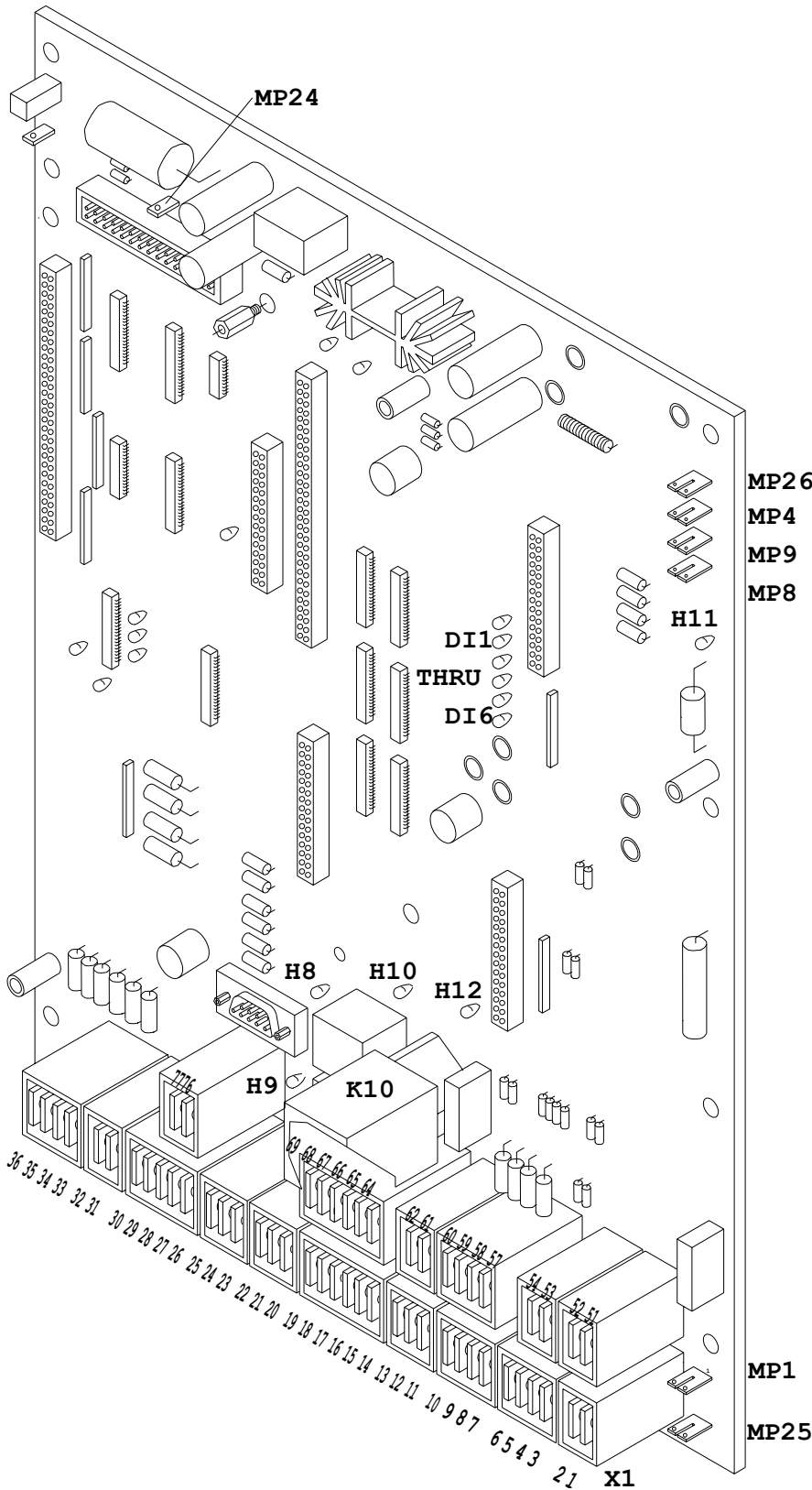
ERROR CODE	ERROR	CAUSE	ACTION
E 91	No data transmission from console to central unit. (Refer to Section 9)	a.)24V supply of console interrupted. b.)Interruption or accidental ground in the line from console electronics to central unit. c.)Transmitter/receiver module defective.	a.) Check 24V at terminal X1 of console electronics. b.) Check the connection between console electronics and central unit. c.) If accidental ground occurs, the transmitter module in the console electronics can be damaged. Replace the console electronics or main board respectively.
E92	Error in the data transmission from console to central unit. (Refer to also Section 3.10)	a.) Temporary interruption of the data line from console electronics to central unit. b.) Transmitter/receiver module defective.	a.) Check the connection between console electronics and central unit.
E93	Error in the data transmission from central unit to console. (Refer to also Section 3.10)	a.) Temporary interruption of the data line from console electronics to central unit. b.) Transmitter/receiver module defective.	Refer to Section 3.10. a.) Check the connection between console electronics and central unit. b.) Replace console electronics or main board respectively.
E94	No data transmission for central unit to console. (Refer to also Section 3.10)	a.) Interruption or accidental ground in the line from console electronics to central unit.  b.) Transmitter/receiver module defective. c.) Data-EPROM defective. d.) CPU defective.  e.) Electromagnetic interference (when switching contractors or valves)	Refer to Section 3.10. a.) Check the connection between console electronics and central unit. If you find an accidental ground, the transmitter module in the console electronics can be damaged. Replace the console electronics. b.) Replace console electronics or main board respectively. c.)Check data EPROM. d.) Replace CPU module. Refer to Drawing 4 and Procedure 3 Steps 1-3, 13,14. e.) Eliminate interference source by inverse diodes or varistors.



ERROR CODE	ERROR	CAUSE	ACTION
E95	Error in the crane data EPROM	a.) Data EPROM defective b.) Position of jumper for the selection of the type of EPROM is wrong c.) Electronics component on the main board defective.	a.) Replace data EPROM b.) Check the jumper position  c.) Replace CPU module. Refer to Drawing 4 and Procedure 3 Steps 1-3, 13,14
E96	Error in the internal RAM of the CPU of the console	CPU or main board of the console defective	Replace CPU module. Refer to Drawing 4 and Procedure 3 Steps 1-3, 13,14
E97	Error in the external RAM of the CPU of the console	a.) External RAM of the console defective b.) Electronic component on the main board defective.	a.) Replace console main board  b.) Replace console main board Refer to Drawing 5.
E98	Wrong jumper position in the console	a.) The jumper position BR 9/BR 10 in the console does not correspond to the actual type of central unit. b.) Electronic component on the main board defective.	a.) Check the jumper position  b.) Replace console main board Refer to Drawing 5.
EAB	Short circuit in the A2B switch circuit	Short circuit in the A2B switch Short circuit in the cable to the A2B switch  Electronic component on the analog input module defective.	Refer to Section 3.6. Replace A2B switch  Replace cable to the A2B switch  Check analog input module. Replace if necessary., Refer to Drawing 4 and Procedure 3 Steps 1,2,4, 11,12.

**CENTRAL UNIT MAIN BOARD LAYOUT**

BOARD P/N  
024-352-300-001



- MP1 = KGND
- MP4 = +5V
- MP8 = +9V
- MP9 = +6V
- MP24 = +BATT
- MP25 = +UBS console, sensors, DI's
- MP26 = GND
- MP29 = +5V hand terminal

- LED'S
- H08 - LOAD
- H09 - A2B
- H10 - MAIN IN/OUT
- H11 - POWER
- H12 - TxD
- HYDRAULIC LINES.

- MP26
- MP4
- MP9
- MP8

- MP1
- MP25

## **PRESSURE TRANSDUCER ZERO ADJUSTMENT PROCEDURE**

### **USING GRAPHIC CONSOLE FOR ZERO-SETTING OF PRESSURE TRANSDUCER & FORCE INPUTS**

The zero setting consists of defining zero-point offset. The zero point offset is added to the transducer measurement to calculate the real physical pressure or force.

To define the zero-point offset the pressure transducer or force sensor must be in equilibrium (no load condition). Therefore the boom must be lowered all the way down (no rest pressure) and the hydraulic hoses disconnected from the pressure transducers.

**CAUTION:** Ensure there is no pressure in the hydraulic line when disconnecting the hoses from pressure transducers.

### **ACTIVATING THE ZERO-SETTING FUNCTION**

To activate the zero-setting Function, press the INFO key on the console to activate the INFO Function. Now press the CTRL key. At this point, a five digit Authorization Number must be entered. Only authorized personnel may adjust the zero-point settings.

Example: 6 4 3 5 6

### **ZERO-SETTING THE TRANSDUCER INPUTS**

Now, having successfully entered a valid password, the piston-side zero-point setting function is activated.

The display shows which transducer (piston-side, rod-side or force) is being zeroed and a horizontal dial marks the present pressure (or force) difference in %. By pressing the + key, the input pressure (or force) is adjusted upwards, and by pressing the minus (-)key, the input value is adjusted downwards. When the plus (+) and minus (-) keys are pressed simultaneously, the zero setting occurs automatically. Manual adjustments may be preformed using + or -.

The return key toggles between the piston-side, the rod-side, and the force zero-setting.

When the operator is finished, pressing the EXC or INFO key returns the console display to normal.