Control and status messages for controllers: 25.9.2018
EM-241-SPF, EM-243-SPF, EM-282-SPF, EM-288-SPF, EM-324-SPF, EM-341-SPF, EM-348-SPF, EM-362-SPF, EM-363-SPF,
EM-A24-SPF, EM-A34-SPF

Read status 1

Data bytes	Value/range	Description
Slave address	1 – 247	
Read holding registers	3	
Address msb	0x04	*Address 41101*
Address lsb	0x4C	
Quantity msb	0	It can be selected to read all or only part of the status data. When zero is used all status data is returned.
Quantity lsb	0-8	Note that quantity is as 16bit registers, but data can have 8bit, 16bit and 32bit values.
CRC lsb	0-255	Read only status data that is needed to keep com. fast.
CRC msb	0-255	

Read status 1 response

Data bytes	Value/range	Description
Slave address	1 – 247	
Read holding registers	3	
Byte count	2-16	
Bus mode	0-3	0=Bus not controlling direction, 1=Bus controls direction, 2=Bus control with 5s timeout, stop at timeout, 3=Bus control with local buttons stop. Returns to 0 in bus mode 2 when timeout and in bus mode 3 when local stop.
Direction	0-3	0=off, 1=Forward, 2=Stop, 3=Backward
Motor current	0-255	*Measured motor current.
Current limit	0-255	Motor current limit value.
Set position, msb	0-3	Scaled servo set position value, 16bit, range 0-1023.
Set position, lsb	0-255	
Motor position, msb	0-3	Scaled servo motor feedback position value, 16bit, range 0-1023.
Motor position, lsb	0-255	
Pulse counter value, msb	0-255	16bit motor position pulse counter value.
Pulse counter value, lsb	0-255	
Supply voltage	0-255	Measured supply voltage value. Value 25 = 10V.
Motor PWM	0-255	Motor output pwm value.
Fault code	0-9	1=overcurrent, 2=pulses missing, 3=overtemp, 4=overvoltage, 5=driving timeout, 6=pulse counter invalid, only home/learn possible, 7=bus com. timeout, 8=homing going on, 9=learning going on.
Set input	0-255	Analog value of position set input.
Inputs	0-7	**Limit sw fw, limit sw bw, reset/home/learn inputs state on/off shown as bitmap: Limit sw fw =bit0, limit sw bw =bit1, reset/home/learn=bit2. Example: bitmap 0b00000101 means limit sw fw and reset/home/learn inputs are on, others are off.
Not in use	0	Zero is added to keep byte count even if needed by modbus implementation.
CRC lsb	0-255	
CRC msb	0-255	

*In EM-348 value 10 = 1A.

**In EM-348 there is no limit sw fw input.

Control command

Data bytes	Value/range	Description
Slave address	1 – 247	
Write multible registers	16	
Address msb	0x03	*Address 41001*
Address lsb	0xE8	
Quantity msb	0	
Quantity lsb	1-3	
Byte count	2-6	
Bus mode	0-6	* 0=Bus not controlling position, 1=Bus controls position, 2=Bus control with timeout, stop at 5s timeout, 3=Bus control with local buttons stop, 4=Both 2 and 3 in use. 5=Bus control selected by input. 6=Local control selected by input. Returns to 0 in bus mode 2 when timeout and in bus mode 3 when local stop and with both in mode 4. To continue, reset this by first setting bus mode to 0 and then again to wanted value. When timeout occurs, on board led shows timeout fail 7 blinks, motor is stopped. This can be reset locally by pressing shortly home/reset button. Or by bus with first setting bus mode to 0 and then to some value.
Servo set position, msb	0-3	16bit servo set value. Range 0-1023. To drive, bus has to be controlling position with bus mode cmd.
Servo set position, lsb	0-255	
Command	0,4,5,6,7	0=no command, 4=start home, 5=start learn, 6=stop, 7=clear fault. When fault is cleared from status message return this value to 0. After stating home or learn, return the value to 0. Home/learn process can be seen in status value: fault code, when going on pulse counter value is invalid.
Speed	0-255	Maximum speed value as motor voltage. Speed is proportional to supply voltage. f.ex. With value 127 maximum voltage to motor is 50% of supply voltage. With 0 parameter value is used instead.
Current limit	0-255	**Current limit value. With 0 parameter value is used instead.
CRC lsb	0-255	
CRC msb	0-255	

* Local/bus controlling can be selected by various options.

It can be selected that the bus only controls the driver, or bus controls until timeout is detected or which ever local input command is used.

Additionally its possible to use local/bus control parameter to set limit sw bw input to work as local/bus control selection. In that case the original input function is not used.

When set with parameter, this bus mode is constantly 5 or 6 depending on the input state. In this bus mode value is only indicative and can not be changed,

local/bus selection input controls it.

**In EM-348 value 10 = 1A.

Control command response

Data bytes	Value/range	Description
Slave address	1 – 247	
Write multible registers	16	
Address msb	0x03	*Address 41001*
Address lsb	0xE8	
Quantity msb	0	
Quantity lsb	1-3	
CRC lsb	0-255	
CRC msb	0-255	