

## 7.1 Error Numbers Servopneumatic Welding Gun System CPX-WELD-2G-SA

Nr	Error	Description	Monitoring			
			CPX	MPYE	MPYD	Cylinder
1	- (not taken)					
2	- (not taken)					
3	Pressure Supply	The chamber pressures of both chambers are a defined time less than 1,17bar	X			
4	Max Cylinder Force	The current cylinder force is greater than the maximum cylinder force parameterized in WinSPAS under "System" for at least 50 ms.	X			
5	Memory Error	Checksum in the FRAM wrong. Each time you save (download via WinSPAS), the values of certain memory cells are added together and the total is saved. When booting up the controller, the contents are added back and compared with the stored sum.	X			
6	Position Not Reachable	The specified position (electrode position) is greater than the maximum opening width for at least 20 ms.	X			
7	- (not taken)					
8	Force Setpoint	The nominal force is greater than the maximum cylinder force parameterized in WinSPAS under "System" for at least 20 ms	X			
9	Position Timeout	The target position was not reached within 10 seconds. [MC Bit] Control deviation in the position controller smaller than or equal to 3 mm.	X			
10	Force Timeout	The target force was not reached within 2 seconds. [MC Bit] Control deviation in the pressure controller less than 600 mbar.	X			
11	Direction of Motion	<p>The fault is only monitored in the positioning mode. It is not monitored during force build-up, air shutdown and fault.</p> <p>When a new position specification is received, the actual speed of the drive is saved. When the MPYE opens more than 75%, the direction of the current speed is compared with the stored one.</p> <p>The detection is switched off when a correct direction of movement has been detected and is switched on again after errors [E003] and [E033].</p>	X			
12	Counterbalance Timeout	<p>The error is monitored in active as well as inactive compensation. The error is output if the specified compensation pressure is not reached for 1800ms (tolerance + -600mbar).</p> <p>If compensation is activated, the pressure must be reached for a certain time (+ -600mbar for &gt; = 10ms). If this is reached, an OK flag is set internally. This monitoring was additionally introduced because the force build-up time is typically shorter than 1800ms.</p> <p>Balance must be active for at least 300ms. If the force buildup is shorter, no error is output.</p> <p>This error is also output when the set pressure is higher than the supply pressure.</p>	X			
13	Parameters	Checksum at initialization is 0. FRAM is completely empty. Servicing.	X			
14	- (not taken)					
15	Calibration of Force	Automatic force calibration in WinSPAS. Calibration line has negative slope	X			
16	Electrode Broken	The electrode position is smaller than the zero position from the reference travel + the electrode monitoring limit value written in WinSPAS during the build-up of force for at least 12ms. The error is not monitored during path calibration and homing.	X			
17	Friction Low	The friction measured during reference travel is	X			

		smaller than the limit parameterized in WinSPAS. After the path calibration or after resetting the detection in WinSPAS, a friction mean value is formed during the first 10 homing runs and compared against this from the 11th homing run. If the friction is at least 3 times lower than the stored value, it will generate an error.				
18	Friction High	The friction measured during reference travel is greater than the limit parameterized in WinSPAS. After the path calibration or after resetting the detection in WinSPAS, a friction mean value is formed during the first 10 homing runs and compared against this from the 11th homing run. If the friction is at least 3 times higher than the stored value, it will generate an error.	X			
19	Sheet Thickness	The error is only monitored during position control in the force build-up. The target welding force was reached before the reference position + plate thickness.	X			
20	Short Circuit Output 0	The short output of the output driver for Output0 returns short circuit.	X			
21	Short Circuit Output 1	The short output of the output driver for Output1 returns short circuit.	X			
22	Short Circuit Control Valve Stop (Output 2)	The short output of the output driver for Output2 returns short circuit.	X			
23	Short Circuit Control Valve Energy (Output 3)	The short output of the output driver for Output3 returns short circuit.	X			
24	- (not taken)					
25	- (not taken)					
26	Closed Loop Parameters	The controller factor K0 is 0 (factory setting) and Enable has been set.	X			
27	Welding Position	The cylinder is less than 4mm before the cylinder end position (bearing cap) during is in the force build-up	X			
28	Unwanted Movement	If, after reaching MC_Position in State HoldPosition or State Work, the control difference becomes greater than 10mm, the error is triggered (error reaction) but not yet reported. There must not be any error in the pressure supply and the check valves must not be switched. After 10s, the error is reported if no other error is present. If another error occurs in the meantime, the monitoring is restarted again.	X			
29	Drift	In addition, there is an absolute drift detection, which is switched off immediately from US2 or air saving mode is actively active. Thus, even in the first 10 seconds in which the relative drift is not measured yet. The limit value for absolute drift is a CPX parameter and can be set via WinSPAS. Exceeding the absolute drift will only result in a status word change and not a system error, as with relative drift. If the absolute drift is exceeded, the status bit Compare setpoint / actual position is set to 0.	X			
30	Stop Function Main Cylinder	<p>The blocking function of the main cylinder is checked by the diagnostic function at the end of homing.</p> <p>Main cylinder check valves closed:</p> <p>Output 2 off =&gt; 1V4 not actuated =&gt; 1V6 and 1V7 not actuated =&gt; Cylinder pressures blocked.</p> <p>Master cylinder check valves open:</p> <p>Output 2 actuated =&gt; 1V4 actuated =&gt; 1V6 and 1V7 actuated =&gt; shut-off valves open.</p> <p>Description: The blocking function should be run at regular intervals. To keep the current interface between robot and SPZ unchanged, the function is executed at the end of the homing. Homing is performed after each milling of the electrode caps. Typically, the electrode caps are milled after several 100 welding spots. This ensures that the function is always executed. For the robot software, the zero position input signal is delayed by about 3-5 seconds. Timing control is implemented so that the</p>	X			

		function is not called on every homing. After the preset time has elapsed, the function is executed in the next homing. The interval is 240 minutes (4 hours). Thus, the function is run at least once every 8 hours. If the function terminates with an error, the time last function will not be set to zero. Thus, the function is restarted immediately on the next homing run. The number of diagnostic errors increased. The number of diagnostic errors is stored in the FRAM. If the number of diagnostic errors at Power On is not equal to zero, the E30 is output. With Power Off, the current duty cycle is stored in the FRAM. Error E30 is output if bit Homing = 0 and clamp is back to the original setpoint position. If the homing bit = 0 is completed before completion of the function, the function is interrupted. The time last execution the function is not set to zero. The execution of the last function is stored in the FRAM at Power Down. Thus, the duty cycle is stored persistently.				
31	- (not taken)					
32	- (not taken)					
33	Main Cylinder CAN Communication	Timeout CAN-Communication	X			
34	Main Cylinder Position Sensor	Distance sensor gives a value outside the permissible values. Does not apply during force build-up.				X
35	Main Cylinder Pressure Sensor P4	Pressure sensor gives a value outside the permissible limits.				X
36	Main Cylinder Pressure Sensor P2	Pressure sensor gives a value outside the permissible limits.				X
37	Main Cylinder Voltage	Supply voltage main cylinder below 17V				X
38	Main Cylinder Diagnostic Memory					X
39	Main Cylinder Parameter Memory	wrong checksum at boot up				X
40	- (not taken)					
41	- (not taken)					
42	- (not taken)					
43	Main Valve CAN Communication	Timeout CAN-Communication	X			
44	Main Valve Clamp	If, with the controller active, the valve control value is > 95% and the valve control error is > 0.65mm, the error comes after 1s.		X		
45	Main Valve Temperature	The temperature rises above 90 ° C. Component error is removed when the temperature drops below 80 ° C again.		X		
46	Main Valve Voltage	The voltage drops below 16V Component error is removed when the voltage rises above 17V		X		
47	- (not taken)					
48	- (not taken)					
49	Main Valve Adjustment	The valve was not adjusted at production factory. Adjustment bit not set in status byte. Servicing.		X		
50	- (not taken)					
51	- (not taken)					
52	- (not taken)					
53	Counterbalance Valve CAN Communication	Timeout CAN-Communication	X			
54	Counterbalance Valve Clamp	If, with the controller active, the valve control value is > 95% and the valve control error is > 0.65mm, the error comes after 1s.			X	
55	Counterbalance Valve Temperature	The temperature rises above 90 ° C. Component error is removed when the temperature drops below 80 ° C again.			X	
56	Counterbalance Valve Voltage	The voltage drops below 16V Component error is removed when the voltage rises above 17V			X	
57	- (not taken)					
58	- (not taken)					
59	Counterbalance Valve Adjustment	The valve was not adjusted at production factory. Adjustment bit not set in status byte. Servicing.			X	
60	- (not taken)					

61	- (not taken)				
62	- (not taken)				
63	Configuration Error	The configuration error occurs with unequal part number of configured cylinder in the open project and connected cylinder after connecting to WinSPAS.	X		
64	- (not taken)				