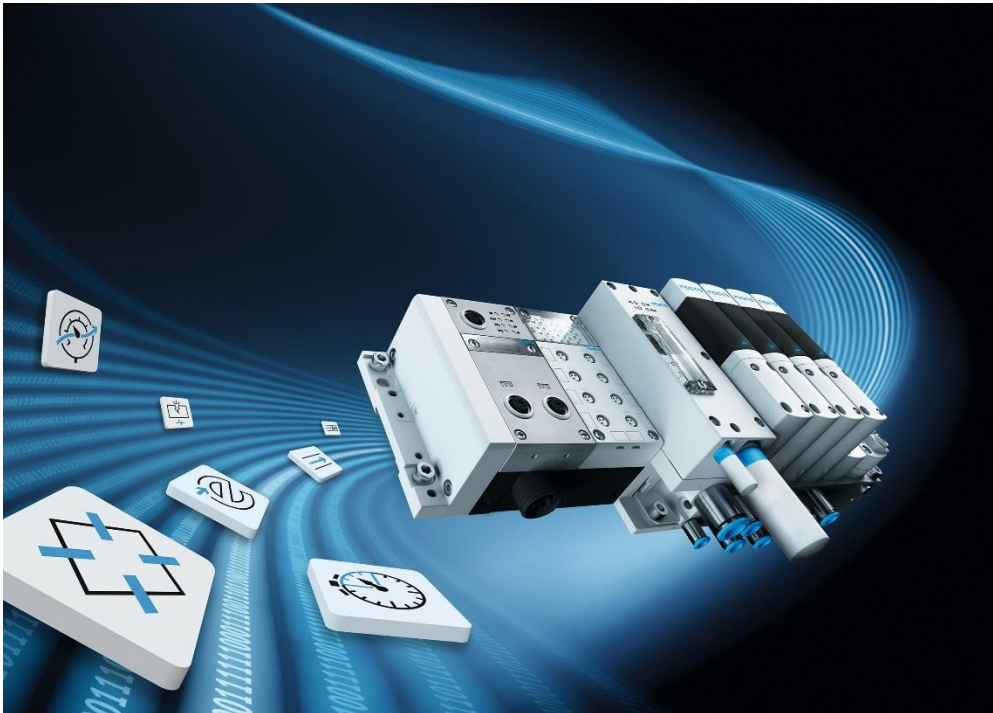


Festo Motion Terminal (VTEM)

FESTO



Malfunction codes

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Diagnostics using transfer mode

The following tables contain all the malfunction codes and sub-codes relevant to the application that can be stored in the diagnostic memory of the Festo Motion Terminal (VTEM).

A detailed description of the diagnostic function via transfer mode can be found in the operating instructions.

1 Malfunctions in basic system

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
Hardware fault				
1	0	Valve hardware defect	Shut down electrical and pneumatic supply and replace valve	106
	1	Piezo failure in valve		
	2	Voltage conversion defective in valve		
	3	Leakage in pilot control in valve		
	4	Leakage in booster in valve		
	5	Pressure sensor defective in valve		
	6	Stroke conversion defective in valve		
	7	Voltage too high in valve		
	8	Temperature sensor defective in valve		
	9	Production data of valve invalid		
	10	Valve not supported		
11	Piezo offset identification failed			
2	0	Controller hardware defect	Replace Motion Terminal (controller)	107
	1	Atmospheric pressure sensor defective in controller		
	2	Supply pressure sensor defective in controller		
	3	Exhaust air pressure sensor defective in controller		
	5	Pressure sensors or controller defective		
	14	Backplane ID unknown		
	15	Backplane not supported		
	16	Atmospheric pressure sensor of controller outside of valid range of values		
17	Supply pressure sensor of controller outside of valid range of values			

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
2	18	Exhaust air pressure sensor of controller outside of valid range of values	Replace Motion Terminal (controller)	107
3	0	Hardware defect, input module 1	Shut down electrical supply and replace input module	115
	10	Input module 1 not supported		
4	0	Hardware defect, input module 2	Shut down electrical supply and replace input module	115
	10	Input module 2 not supported		
9	0	Short-circuit in one of the connected sensors at input module 1	Replace sensor	2
10	0	Short-circuit in one of the connected sensors at input module 2	Replace sensor	2
Operational fault				
15	0	Over-temperature in valve	Check ambient conditions and restart; if appropriate, shut down electrical and pneumatic supply and replace valve	75
16	0	Value range for temperature measurement violated in controller	Check ambient conditions and restart; if appropriate, shut down electrical and pneumatic supply and replace valve	75/80
	1	Value range for temperature measurement violated in controller: measured value > 85 °C		75
	2	Value range for temperature measurement violated in controller: measured value < -20 °C		80
21	0	Error in internal communication	Check ambient conditions and restart; if appropriate, shut down electrical and pneumatic supply and replace valve/input module	110
	1	Communication failure, controller to valve		
	2	Communication malfunction, valve to controller		
	3	Communication failure, valve to controller		
	4	Communication failure, controller to input module 1		
	5	Communication malfunction, input module 1 to controller		
	6	Communication failure, input module 1 to controller		
	7	Communication failure, controller to input module 2		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
21	8	Communication malfunction, input module 2 to controller	Check ambient conditions and restart; if appropriate, shut down electrical and pneumatic supply and replace valve/input module	110
	9	Communication failure, input module 2 to controller		
22	0	Error communicating with higher-order controller (PLC)	Check PLC and connection; if appropriate, restart	110
	1	Communication with higher-order controller (PLC) interrupted		
	5	Communication with CPX terminal interrupted after firmware update (restart required)	Restart	
23	0	Internal software error	Restart; if appropriate, perform firmware update, contact support department (provide malfunction code/subcode and malfunction text displayed in WebConfig)	115
28	0	Error during valve self-calibration	Renewed start of a Motion App; in case of repeated occurrence shut down electrical and pneumatic supply and replace valve	–
29	0	Malfunction list is full (new entries not possible until errors acknowledged)	Fix active errors and reset malfunction list by acknowledging errors (valve mode 62)	–
Initialisation failed				
30	0	Module update not possible	Check consistency of hardware versions; if appropriate, shut down electrical and pneumatic supply and replace module	115
31	0	Module update required	Perform module update	231
	1	Bootloader version of valve invalid		
	2	Software version of valve invalid		
	3	Bootloader version of input module 1 invalid		
	4	Software version of input module 1 invalid		
	5	Bootloader version of input module 2 invalid		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
31	6	Software version of input module 2 invalid	Perform module update	231
32	0	Stored data incorrect	Restart; set and save parameters again	100
	1	Stored configuration incomplete	Set and save parameters again	
	2	Stored configuration not compatible with the current firmware version		
	3	Error during write access to stored configuration	Save again; if appropriate, restart; set and save parameters again	
	11	Stored teach-in data for Motion App with full-stroke sensors incomplete	Restart; execute teach-in run for Motion App with full-stroke sensors again	
	12	Stored teach-in data for Motion App with full-stroke sensors not compatible with the current firmware version		
	13	Error during write access to stored teach-in data for Motion App with full-stroke sensors	Execute teach-in run for Motion App with full-stroke sensors again	
	21	Stored settings for signal tracing and signal generator incomplete	Set and save settings for signal tracing and signal generator again	
	22	Stored settings for signal tracing and signal generator not compatible with the current firmware version		
	23	Error during write access to stored settings for signal tracing and signal generator	Save again; if appropriate, restart; set and save settings for signal tracing and signal generator again	
33	0	Motion App licensing failed	Contact support department	229
34	0	Version information incorrect	Contact support department	115
Supply error				
40	0	Malfunction of load voltage	Check load voltage and cabling	5
42	0	No reaction of the valve despite being triggered, possibly due to a malfunction of pilot pressure	Check pilot pressure and tubing connection; in case of a hardware defect shut down electrical and pneumatic supply and replace valve	85
Assembly fault				
50	0	Module installed incorrectly	Check position and type of modules	228
	1	Invalid module at slot 0		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
50	2	Invalid module at slot 1	Check position and type of modules	228
	3	Invalid module at slot 2		
	4	Invalid module at slot 3		
	5	Invalid module at slot 4		
	6	Invalid module at slot 5		
	7	Invalid module at slot 6		
	8	Invalid module at slot 7		
	9	Invalid module at slot 8		
	10	Invalid module at slot 9		
69	0	Input module configuration invalid	Check input modules for compatibility	228

Tab. 1 Malfunctions in basic system

2 Application-specific malfunctions

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
Parameters or setting values invalid				
71	0	Invalid value for a system parameter in the range of indices 10 ... 19 (tubing)	Comply with valid ranges of values for the parameters of the Motion App being run	–
	3	Invalid value for system parameter “tubing length at (2)”		
	4	Invalid value for system parameter “tubing length at (4)”		
	5	Invalid value for system parameter “tubing inner diameter at (2)”		
	6	Invalid value for system parameter “tubing inner diameter at (4)”		
72	0	Invalid value for a system parameter in the range of indices 20 ... 39 (drive)	Comply with valid ranges of values for the parameters of the Motion App being run	–
	1	Invalid value for system parameter “drive type”		
	2	Invalid value for system parameter “drive stroke”		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
73	0	Invalid value for a system parameter in the range of indices 40 ... 59 (volume)	Comply with valid ranges of values for the parameters of the Motion App being run	–
	1	Invalid value for system parameter “volume at (2)”		
	2	Invalid value for system parameter “volume at (4)”		
	3	Invalid value for system parameter “operating medium”		
74	0	Invalid value for a system parameter in the range of indices 60 ... 69 (environment)	Comply with valid ranges of values for the parameters of the Motion App being run	–
	1	Invalid value for system parameter “mounting position of drive”		
	2	Invalid value for system parameter “offset axis zero point”		
75	0	Invalid value for a system parameter in the range of indices 70 ... 89 (sensor ports)	Comply with valid ranges of values for the parameters of the Motion App being run	–
	1	Invalid value for system parameter “sensor port for end position detection retracted”		
	2	Invalid value for system parameter “sensor port for end position detection advanced”		
	6	Invalid value for system parameter “sensor port for partial-stroke measurement retracted”		
	7	Invalid value for system parameter “sensor port for partial-stroke measurement advanced”		
	11	Invalid value for system parameter “sensor port for full-stroke measurement”		
	12	Invalid value for system parameter “sensor port for flow rate measurement at (2)”		
	13	Invalid value for system parameter “sensor port for flow rate measurement at (4)”		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
77	0	Invalid value for one or more (application) parameters in context of the total configuration	Comply with valid ranges of values and respect interdependences between the parameters of the Motion App being run	–
	1	Implausible parametrisation: condition [maximum leakage for status “Good” < “Warning” < “Critical”] violated	Respect interdependences between the parameters of the Motion App being run	
	2	Implausible parametrisation: offset axis zero point implausible in relation to drive stroke		
	3	Implausible parametrisation: offset project zero point implausible in relation to drive stroke and offset axis zero point		
	4	Implausible parametrisation: offsets software limits implausible in relation to drive stroke and offset axis zero point		
	5	Implausible parametrisation: condition [software limit negative < software limit positive] violated		
	6	Implausible parametrisation or missing teach-in run: offset axis zero point implausible in relation to drive stroke and teach-in data		
	7	Implausible parametrisation: sensor port invalid with selected operating mode	Respect interdependences between the parameters of the Motion App being run	
	9	Implausible parametrisation: operating mode invalid due to missing input module	Check selected operating mode; if appropriate, shut down electrical and pneumatic supply and mount input module and sensor	
78	0	PLC command invalid	Check command sequence in PLC program	–
	1	Valve mode invalid		
	2	App control invalid		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
78	3	App option invalid	Check command sequence in PLC program	–
	4	Setpoint value 1 invalid		
	5	Setpoint value 2 invalid		
79	0	Actual value outside of defined value range	Interpret actual value that is output (is saturated to the limit of the value range)	–
	1	Determined actual value 1 lower than minimum of defined value range		
	2	Determined actual value 1 higher than maximum of defined value range		
	3	Determined actual value 2 lower than minimum of defined value range		
	4	Determined actual value 2 higher than maximum of defined value range		
84	0	Configuration of user-defined peripherals incorrect	Check configuration of user-defined peripherals and their mapping	100
	1	Definition of user-defined position sensor 1 incorrect or invalid for use by the desired Motion App	Check configuration of user-defined position sensor and input module configuration	
	2	Definition of user-defined position sensor 2 incorrect or invalid for use by the desired Motion App		
	3	Definition of user-defined position sensor 3 incorrect or invalid for use by the desired Motion App		
	11	Definition of user-defined drive 1 incorrect or invalid for use by the desired Motion App	Check configuration of user-defined drive and system parameters of the Motion App	
	12	Definition of user-defined drive 2 incorrect or invalid for use by the desired Motion App		
	13	Definition of user-defined drive 3 incorrect or invalid for use by the desired Motion App		
	14	Definition of user-defined drive 4 incorrect or invalid for use by the desired Motion App		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
84	15	Definition of user-defined drive 5 incorrect or invalid for use by the desired Motion App	Check configuration of user-defined drive and system parameters of the Motion App	100
	16	Definition of user-defined drive 6 incorrect or invalid for use by the desired Motion App		
	17	Definition of user-defined drive 7 incorrect or invalid for use by the desired Motion App		
	18	Definition of user-defined drive 8 incorrect or invalid for use by the desired Motion App		
86	0	Interpretation of a parameter value changed due to a setting	Check settings on interpretation of parameter values	100
Start condition of Motion App not met				
101	0	Analogue input module not present	Shut down electrical supply and install input module	–
102	0	Digital input module not present	Shut down electrical supply and install input module	–
103	0	Drive not in required initial position	Move drive to required initial position	–
	1	Drive not in (correct) end position		
104	0	No teach-in data for desired Motion App available, (new) teach-in run necessary	Execute teach-in run for desired Motion App	–
	1	Parameters have been changed after execution of the teach-in run (Check the need for a new teach-in run)		
105	0	Movement test not executed successfully	Check assignment of tubing and sensors	–
106	0	Configuration of the linked input module port does not comply with the requirements of the Motion App	Check input module configuration and selection of input module port in the system parameters	–
	1	Sensor type at selected input module port for 'retracted' end position detection does not comply with the requirements of the Motion App		
	2	Sensor type at selected input module port for 'advanced' end position detection does not comply with the requirements of the Motion App		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
106	6	Sensor type at selected input module port for partial-stroke measurement 'retracted' does not comply with the requirements of the Motion App	Check input module configuration and selection of input module port in the system parameters	–
	7	Sensor type at selected input module port for partial-stroke measurement 'advanced' does not comply with the requirements of the Motion App		
	11	Sensor type at selected input module port for full-stroke measurement does not comply with the requirements of the Motion App		
	12	Sensor type at selected input module port for flow measurement at (2) does not comply with the requirements of the Motion App		
	13	Sensor type at selected input module port for flow measurement at (4) does not comply with the requirements of the Motion App		
Supply malfunction				
130	0	Supply pressure too low	Check supply pressure and tubing connection; in case of a desired operating pressure below 3 bar, provide external pilot air supply with at least 3 bar and deactivate low-pressure monitoring at port (1) via CPX module parameter	105
131	0	Supply pressure too high	Check supply pressure	105
132	0	Supply pressure unsuitable for desired Motion App	Check supply pressure	105
	1	Supply pressure too low for desired Motion App		
	2	Supply pressure too high for desired Motion App		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
Malfunction in the execution of a Motion App				
140	0	Motion App malfunction: end position velocity too high	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: end position velocity too high in ‘retracted’ end position ((2) pressurised)		
	2	Motion App malfunction: end position velocity too high in ‘advanced’ end position ((4) pressurised)		
	3	Motion App malfunction: high velocity near ‘retracted’ end position ((2) pressurised) with risk of a too heavy impact	Check parameters (for details see documentation of Motion App)	
	4	Motion App malfunction: high velocity near ‘advanced’ end position ((4) pressurised) with risk of a too heavy impact		
	5	Motion App malfunction: maximum velocity for entire stroke exceeded	Check parameters; in case of malfunction during teach-in run, restart it (for details see documentation of Motion App)	
141	0	Motion App malfunction: weight force in measurement position too high (weight force > 75 % pneumatic force)	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: weight force in ‘advanced’ state too high		
	2	Motion App malfunction: weight force in ‘retracted’ state too high		
142	0	Motion App malfunction: teach-in run not successful	Check drive, tubing and sensors, execute teach-in run again (for details see documentation of Motion App)	–
	1	Motion App malfunction: teach-in run could not be completed		
	2	Motion App malfunction: teach-in run partly not successful (desired performance might not be achievable)		
	3			
	4			
	5			
	6			

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
142	7	Motion App malfunction: teach-in run partly not successful (desired performance might not be achievable)	Check drive, tubing and sensors, execute teach-in run again	–
	8			
	9			
143	0	Motion App malfunction: controlled stop due to a violation of end position monitoring	Consider last occurred warning; if appropriate, deactivate end position monitoring (for details see documentation of Motion App)	–
	1	Motion App malfunction: standstill of the drive after completion of a controlled stop		
	2	Motion App malfunction: braking process running after initiation of a controlled stop		
144	0	Motion App malfunction: controlled stop due to a violation of end position monitoring	Consider last occurred warning; if appropriate, deactivate end position monitoring (for details see documentation of Motion App)	–
	1	Motion App malfunction: standstill of the drive after completion of a controlled stop		
	2	Motion App malfunction: braking process running after initiation of a controlled stop		
145	0	Motion App malfunction: target pressure > supply pressure	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: target pressure > supply pressure at (2)		
	2	Motion App malfunction: target pressure > supply pressure at (4)		
	3	Motion App malfunction: target pressure > supply pressure at (2) + (4)		
146	0	Motion App malfunction: target pressure < exhaust air pressure	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: target pressure < exhaust air pressure at (2)		
	2	Motion App malfunction: target pressure < exhaust air pressure at (4)		
	3	Motion App malfunction: target pressure < exhaust air pressure at (2) + (4)		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
147	0	Motion App malfunction: increased deviation with booster strokes in valve	Check compliance with the functional range of the Motion App	–
148	0	Motion App malfunction: unexpected exiting of end position	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: unexpected exiting of 'retracted' end position ((2) pressurised)		
	2	Motion App malfunction: unexpected exiting of 'advanced' end position ((4) pressurised)		
149	0	Motion App malfunction: end position not reached	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: 'retracted' end position ((2) pressurised) not reached		
	2	Motion App malfunction: 'advanced' end position ((4) pressurised) not reached		
150	0	Motion App malfunction: pressure build-up not successful	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: pressure build-up not successful at (2)		
	2	Motion App malfunction: pressure build-up not successful at (4)		
151	0	Motion App malfunction: pressure reduction not successful	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: pressure reduction not successful at (2)		
	2	Motion App malfunction: pressure reduction not successful at (4)		
153	0	Motion App malfunction: increased control deviation during execution of a closed-loop controlled Motion App	Check parameters, check drive for impaired movement (for details see documentation of Motion App)	–
	1	Motion App malfunction: increased control deviation for position		
	2	Motion App malfunction: increased control deviation for velocity		

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
153	4	Motion App malfunction: increased control deviation for flow rate at (2)	Check target flow rate, consider correlations and limitations from the overall physical system	–
	5	Motion App malfunction: increased control deviation for flow rate at (4)		
154	0	Motion App malfunction: error in path planning	Check compliance with the functional range of the Motion App (for details see documentation of Motion App)	–
	1	Motion App malfunction: error in path planning due to a target velocity of zero	Adjust setpoint value “maximum velocity (currently)” (for details see documentation of Motion App)	
	2	Motion App malfunction: distance too short to reach target position without overshooting	Do not set new setpoint value “target position” while movement is still in progress or set it earlier; if appropriate, adjust dynamics parameters (for details see documentation of Motion App)	
	3	Motion App malfunction: distance too short to reach target position with desired final velocity	Do not set new setpoint value “target position” while movement is still in progress or set it earlier, check parameter “final velocity in contact case”; if appropriate, adjust dynamics parameters (for details see documentation of Motion App)	
	4	Motion App malfunction: distance too short to reach desired final velocity already at desired distance ahead of target position	Do not set new setpoint value “target position” while movement is still in progress or set it earlier, check parameters “distance to target position with constant final velocity” and “final velocity in contact case”; if appropriate, adjust dynamics parameters (for details see documentation of Motion App)	

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
154	5	Motion App malfunction: scheduled path outside 'retracted' end position ((2) pressurised) with risk of a too heavy impact	Do not set new setpoint value "target position" while movement is still in progress or set it earlier, do not suddenly reduce setpoint value "maximum velocity (currently)", check dynamics parameters (for details see documentation of Motion App)	–
	6	Motion App malfunction: scheduled path outside 'advanced' end position ((4) pressurised) with risk of a too heavy impact	Do not set new setpoint value "target position" while movement is still in progress or set it earlier, check dynamics parameters (for details see documentation of Motion App)	
	7	Motion App malfunction: desired final velocity invalid (is saturated in path planning)	Consider limitation by parameter "maximum velocity (general)" and setpoint value "maximum velocity (currently)"	
155	0	Motion App malfunction: control value limitation violated	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: supply pressure very low for reaching the desired setpoint values	Check supply pressure (for details see documentation of Motion App)	
	2	Motion App malfunction: required valve conductance very high	Adjust parameters for dynamics requirements (for details see documentation of Motion App)	
	3	Motion App malfunction: exhaust air pressure very high in relation to the parameterised mean pressure level	Check exhaust air pressure; adjust parameter for mean pressure level (for details see documentation of Motion App)	
	4	Motion App malfunction: supply pressure very low in relation to the parameterised mean pressure level	Check supply pressure; adjust parameter for mean pressure level (for details see documentation of Motion App)	

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
155	5	Motion App malfunction: setpoint flow rate for (2) too low to be controlled exactly (setpoint value is ignored)	Check setpoint setting; if appropriate, adjust threshold value for minimum considered setpoint via tuning parameter	–
	6	Motion App malfunction: setpoint flow rate for (4) too low to be controlled exactly (setpoint value is ignored)		
188	0	Controller overloaded	Contact support department	101
	1	Motion App operation stopped due to controller overload		
189	0	Motion App operation is based on demo licences and demo period (active Motion App will be stopped after time has expired)	Consider remaining time of demo period; alternatively: stop Motion App and deactivate option “usage of demo licences”	101
	1	Demo period is running, but option “usage of demo licences” is not activated	Consider remaining time of demo period; if appropriate, activate option “usage of demo licences”	
	2	Demo period almost expired (with option “usage of demo licences” activated, active Motion App will be stopped after time has expired)	Consider remaining time of demo period; alternatively: stop Motion App within the remaining time and deactivate option “usage of demo licences” to avoid unwanted stopping at the end of the demo period	
	3	Demo period expired, option “usage of demo licences” ended	Restart Motion App; if appropriate, install licence file with additionally required licences and restart device	
Deviation from setpoint behaviour				
190	0	Motion App malfunction: travel time not achieved	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: target travel time for advancing ((4) pressurised) not achieved		
	2	Motion App malfunction: target travel time for retracting ((2) pressurised) not achieved		
192	0	Motion App malfunction: expected movement did not occur (timeout)	Check drive and tubing	–

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
192	1	Motion App malfunction: no advancing movement ((4) pressurised) (timeout)	Check drive and tubing	–
	2	Motion App malfunction: no retracting movement ((2) pressurised) (timeout)		
193	0	Motion App malfunction: desired performance might not be achievable	Check compliance with the functional range of the Motion App	–
	1	Motion App malfunction: target travel time for advancing ((4) pressurised) might not be achievable		
	2	Motion App malfunction: target travel time for retracting ((2) pressurised) might not be achievable		
	3	Motion App malfunction: requested flow rate at (2) currently not achievable	Possibly desired behaviour depending on the application; otherwise check supply pressure	
	4	Motion App malfunction: requested flow rate at (4) currently not achievable		
	5	Motion App malfunction: maximum velocity might not be complied with	Check compliance with the functional range of the Motion App	
	6	Motion App malfunction: maximum acceleration might not be complied with		
	7	Motion App malfunction: maximum deceleration might not be complied with		
	8	Motion App malfunction: maximum jerk might not be complied with	Check the chain of effects of the flow measurement (condition of the tubing, orientation/effective direction of the sensor, settings and condition of the sensor, condition of the cabling; if existing, configuration of the user-defined sensor; configuration of the input module, selection of input module port in the system parameters)	
	9	Motion App malfunction: requested flow rate at (2) might be reached inaccurately due to faulty flow rate measurement		
10	Motion App malfunction: requested flow rate at (4) might be reached inaccurately due to faulty flow rate measurement			

Tab. 2 Application-specific malfunctions

3 Sensor malfunctions

VTEM malfunction code		Diagnostic message	Recommended course of action	CPX error number
225	0	Sensor error, partial stroke measurement in 'retracted' end position ((2) pressurised)	Check sensor and cabling, check selection of input module port in the system parameters	-
	1	Sensor for partial stroke measurement in 'retracted' end position ((2) pressurised) returns no value	Check sensor and cabling for defect, check selection of input module port in the system parameters	
	2	Position or orientation of sensor for partial stroke measurement in 'retracted' end position ((2) pressurised) incorrect	Check installation position and orientation of the sensor	
	3	Overlap of sensor for partial stroke measurement in 'retracted' end position ((2) pressurised) on side towards 'retracted' end position too small	Check installation position of the sensor	
	4	Overlap of sensor for partial stroke measurement in 'retracted' end position ((2) pressurised) on side towards 'advanced' end position too small		
	7	Wrong or defective sensor for partial stroke measurement in 'retracted' end position ((2) pressurised)	Replace sensor	
226	0	Sensor error, partial stroke measurement in 'advanced' end position ((4) pressurised)	Check sensor and cabling, check selection of input module port in the system parameters	-
	1	Sensor for partial stroke measurement in 'advanced' end position ((4) pressurised) returns no value	Check sensor and cabling for defect, check selection of input module port in the system parameters	
	2	Position or orientation of sensor for partial stroke measurement in 'advanced' end position ((4) pressurised) incorrect	Check installation position and orientation of the sensor	

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
226	3	Overlap of sensor for partial stroke measurement in 'advanced' end position ((4) pressurised) on side towards 'retracted' end position too small	Check installation position of the sensor	-
	4	Overlap of sensor for partial stroke measurement in 'advanced' end position ((4) pressurised) on side towards 'advanced' end position too small		
	7	Wrong or defective sensor for partial stroke measurement in 'advanced' end position ((4) pressurised)	Replace sensor	
230	0	Sensor error, full stroke measurement	Check sensor and cabling, check selection of input module port in the system parameters	-
	1	Sensor for full stroke measurement returns no value	Check sensor and cabling for defect, check selection of input module port in the system parameters	
	2	Position or orientation of sensor for full stroke measurement incorrect	Check installation position and orientation of the sensor	
	3	Overlap of sensor for full stroke measurement on side towards 'retracted' end position ((2) pressurised) too small	Check installation position of the sensor	
	4	Overlap of sensor for full stroke measurement on side towards 'advanced' end position ((4) pressurised) too small		
	5	Piston outside detection range of sensor for full stroke measurement		
	7	Wrong or defective sensor for full stroke measurement	Replace sensor	
231	0	Sensors incorrectly mounted or defective	Check sensors and their installation positions, check selection of input module ports in the system parameters	-

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
231	1	Proximity switch for end position detection incorrectly mounted or defective (both proximity switches indicate “reached”)	Check sensors and their installation positions, check selection of input module ports in the system parameters	–
	2	At least one analogue sensor for partial stroke measurement incorrectly mounted (overlap too small)		
	3	At least one analogue sensor for partial stroke measurement incorrectly mounted (piston outside detection range of both partial stroke sensors)		
	4	Sensor signal noise of one or more analogue sensors too high	Check sensors and cabling for defect; if appropriate, replace sensors	
	5	Jumps in the sensor signal course too high	Check sensors and cabling; if appropriate, replace sensors	
232	0	Sensor error, flow measurement at (2)	Check sensor and cabling, check selection of input module port in the system parameters	–
	3	Sensor for flow measurement at (2) returns no valid value (misconfiguration, sensor defect or reverse flow)	Check the chain of effects of the flow measurement (condition of the tubing, orientation/effective direction of the sensor, settings and condition of the sensor, condition of the cabling; if existing, configuration of the user-defined sensor; configuration of the input module, selection of input module port in the system parameters); avoid unintentional reverse flows as interaction from the overall system	
233	0	Sensor error, flow measurement at (4)	Check sensor and cabling, check selection of input module port in the system parameters	–

VTEM malfunction		Diagnostic message	Recommended course of action	CPX error number
code	subcode			
233	3	Sensor for flow measurement at (4) returns no valid value (misconfiguration, sensor defect or reverse flow)	Check the chain of effects of the flow measurement (condition of the tubing, orientation/effective direction of the sensor, settings and condition of the sensor, condition of the cabling; if existing, configuration of the user-defined sensor; configuration of the input module, selection of input module port in the system parameters); avoid unintentional reverse flows as interaction from the overall system	–

Tab. 3 Sensor malfunctions