



USER INSTRUCTIONS

To be used in conjunction with the IOM for the Logix 520si

Logix 520SD Series

Digital Positioner

FCD LGENIM1520-00

***Installation
Operation
Maintenance***



Experience In Motion

Supplement to IOM for Logix 520si



Caution: The Logix 520SD is a firmware upgrade from the Logix 520si. This upgrade opens the possibility to connect the Logix 520SD with the ValveSight DTM for Logix 520MD positioners. This IOM describes the changes that occur due to the firmware upgrade. Other than these changes, the IOM for the Logix 520si remains valid.

VERSION NUMBER CHECKING

The version number of the embedded code may be checked at any time except during a calibration by holding down the Δ button. This will not alter the operation of the unit other than to change the blink sequence to 3 blinks indicating the major version number. Holding the ∇ button will give the minor version number without affecting operation. The version codes are interpreted by adding up the numbers assigned according to the following table:

Color	First blink value	Second blink value	Third blink value
Green	0	0	0
Yellow	9	3	1
Red	18	6	2

For example if holding the Δ button gave a G-G-R code, and holding the ∇ button gave a Y-Y-G code then the resulting version number would be $(0+0+2).(9+3+0)$ or version 2.12.

STATUS CODES

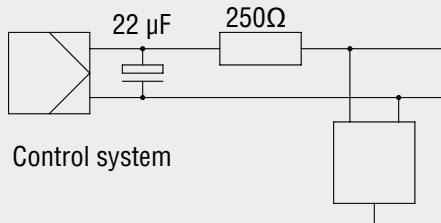
Blink Code	Description	Recommendations
GGGG	NORMAL OPERATION indicates normal, healthy operation	
GGGY	MPC ACTIVE MODE (user set) indicates that tight shutoff (MPC) is active. The command is beyond the user set limit for tight shutoff feature. This is a normal condition for all valves when closed. The factory default setting triggers this at command signals below 1%. This indication may also occur on 3 way valves at both ends of travel if the high MPC value has been set.	If tight shutoff is not desired reset the tight shutoff limits to the correct values or adjust the command signal inside of the specified MPC value. See DTM screen: Configuration/Custom/Position Cutoff.
GGYG	LOCAL INTERFACE DISABLED/ENABLED when DISABLED, indicates PC software has been used to disable the local interface. This code is only present for a short time when the Quick Cal button is pressed.	If local control is desired then the local interface must be re-enabled from the remote software. See DTM screen: Configuration/Basic Local Interface.
GGYY	DIGITAL COMMAND SOURCE indicates a HART signal is needed to change the position command and the analog 4-20 mA input signal is ignored.	A manual Command Source Reset is provided to change the command back to analog control mode from the local interface if a PC or hand held configurator is not available. This is done while a QUICK-CAL is in progress by holding down both the Jog buttons (up and down) while briefly pressing the QUICK-CAL button. A new QUICK-CAL must be done after resetting. See DTM screen: Dashboard.
GGRR	SQUAWK MODE ON/OFF (user set) When ON, this indicates a user has set the positioner to flash a special sequence so that it can be visually located.	This mode is canceled if the Quick-cal button is briefly pressed, the Squawk mode is selected again remotely, or more than one hour has passed since the command was issued. See DTM screen: Configuration/Custom/LED.
GYGG	POSITION LIMIT ALERT (user set) indicates the position has reached or is exceeding a user defined upper or lower position indicator similar to a limit switch indicator.	Reset the indicator if more travel is needed or adjust the command signal back in the specified range. See DTM screen: Configuration/Custom/Position Cutoff. This indicator can be disabled.
GYGY	SOFT STOP LIMIT ALERT (user set) indicates the unit is being commanded to exceed a user defined upper or lower position limit and the internal software is holding the position at the limit. The function is similar to a mechanical limit stop except it is not active if the unit is un-powered.	Reset the limit if more travel is needed or adjust the command signal back in the specified range. See DTM screen: Configuration/Custom/Soft Limits.
GRGG	CYCLES or TRAVEL LIMIT ALERT (user set) indicates that one of the cycle or travel limits has been exceeded. The criterion and count limit are set by the user to track the usage of the valve. There are accumulators for total valve travel, total valve cycles, total spool valve travel, and total spool valve cycles. Flowserve supplies software can identify the specific limit that has been reached.	For valve accumulators indications follow routine procedures for maintenance when the limit is reached such as checking the packing tightness, and checking linkages for wear, misalignment, and tightness. After maintenance, reset the cycle accumulator. See DTM screen: Health Status/Positioner Health. This indicator can be disabled. For spool valve accumulators inspect for high air consumption and signs of wear. See DTM screen: Health Status/Positioner Health. This indicator can be disabled.
YGGY	SIGNATURE IN PROGRESS MODE indicates that a test has been initiated by Flowserve supplied software	Signatures can only be canceled by Flowserve supplied software. See DTM screen: Diagnostics.
YGGR	INITIALIZING MODE displays a blink sequence 3 times when the unit is powering up.	Wait for power up to complete.
YGYG	CALIBRATION IS IN PROGRESS indicates a calibration is process. Calibrations such as stroke may be initiated locally with the Quick-Cal button or remotely. Other calibrations for the inputs and outputs or pressure sensors are only initiated remotely.	Local calibration may be canceled by briefly pushing the quick-cal button. Remote calibrations can only be canceled by the software.
YGY Y	JOG COMMAND STATE indicates the unit has been placed in a local override mode where the valve can only be stroked using the two local jog buttons.	Control the valve using the jog buttons. This mode may be canceled by briefly pushing the quick-cal button.
YGYR	JOG CALIBRATION STATE indicates that during a jog calibration, the unit is waiting for the user to manually adjust the valve position to the desired 100% open position.	Use the buttons on the positioner to adjust the valve to the desired fully open position. See the explanation of Jog Calibrate in the Quick-Cal section of main document for operation.
YYGG	POSITIONER TEMPERATURE WARNING (user set) indicates the internal electronics have exceeded a temperature limit. The minimum limit of the electronics and the default setting is -40°F (-40°C). Low temperature may inhibit responsiveness and accuracy. The maximum limit of the electronics and default setting is 185°F (85°C). High temperature may limit the life of the positioner.	Regulate the temperature of the positioner. If the temperature reading is in error, replace the main board. See DTM screen: Health Status/Positioner Health. This indicator can be disabled.
YYGY	PRESSURE OUT OF RANGE WARNING indicates that during a pressure sensor calibration, the range of applied pressures to port 1 was too small for optimum performance.	Adjust the supply pressure to a proper value (30-150 psig) so the positioner can properly calibrate the sensors. Then recalibrate. Briefly push the quick-cal button to acknowledge this condition and the positioner will operate using the current short stroke calibration values if valid.
YYGR	SUPPLY PRESSURE HIGH WARNING indicates the positioner has determined that the supply pressure is above the user set warning limit.	Regulate the supply pressure at the positioner below the maximum limit recommended for your actuator. Recalibrate pressure sensors. Check the pressure sensor board connections. Replace pressure sensor board if necessary. See DTM screen: Health Status/Actuator Health. This indicator can be disabled.

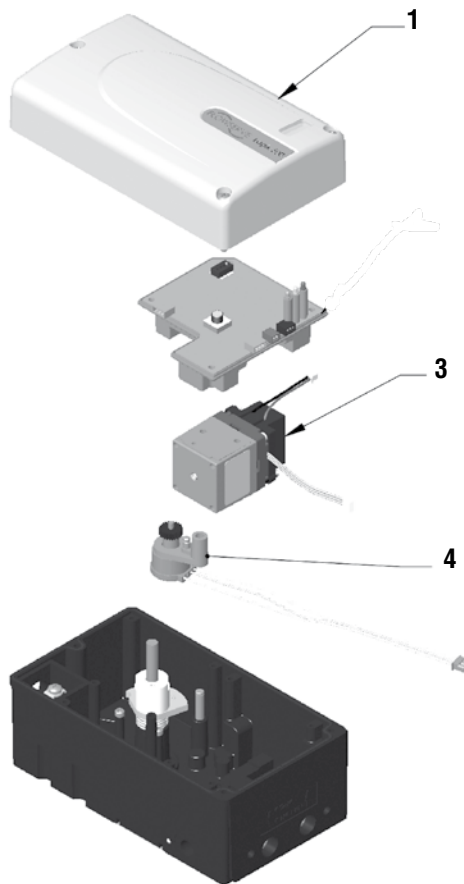


Blink Code	Description	Recommendations
YYYG	SUPPLY PRESSURE LOW WARNING (user set) indicates that the supply pressure is below the user set warning limit. Low supply pressure can cause poor valve response or positioner failure. The minimum recommended supply pressure is 30 PSI (2.1 bar) for proper operation. The unit will fail at less than approximately 17 PSI (1.2 bars). Low supply pressure indications can also be caused by pneumatic leak.	Regulate the supply pressure at the positioner above 30 PSI (2.1 bar). Recalibrate pressure sensors. Ensure system air/gas supply is adequate. Repair kinked supply tubing. Check the pressure sensor board connections and replace pressure sensor board if necessary. Check for pneumatic leaks in the actuator and actuator tubing. See DTM screen: Health Status/Actuator Health. This indicator can be disabled.
YYYY	ACTUATION RATIO WARNING (user set) indicates a decreased ability of the system to actuate the valve. It is based on the ratio of available force to required force to actuate. It is affected by the process load, friction, spring force, and available supply pressure.	Increase the supply pressure. Reduce the friction. Check the actuator spring. Resize the actuator. Adjust user set limits. See DTM screen: Health Status/Actuator Health. This indicator can be disabled.
YRGG	PILOT RELAY RESPONSE WARNING (user set) indicates that the pilot relay is sticking or slow to respond. This affects the responsiveness, increases the chance of limit cycling and excessive air consumption. The pilot relay is part of the inner loop and consists of the driver module assembly with piezo (I-P relay) which is coupled to the poppet. The value of this indicator corresponds with inner loop lag. Delayed response can be caused by a partially clogged piezo or debris, oil, corrosion or low supply pressure.	Check response of the valve. If OK, adjust Pilot Relay Response limits. Check supply pressure. Replace the piezo or driver module assembly. Maintain a clean, water-free air/gas supply. See DTM screen: Health Status/Positioner Health. This indicator can be disabled.
YRGY	FRICITION LOW WARNING (user set) indicates the friction has passed below the user set limit.	Low friction is usually an indication of improperly loaded packing or seals in the valve and actuator. See DTM screen: Health Status/Valve Health. This indicator can be disabled.
YRGR	PNEUMATIC LEAK WARNING (user set) indicates that the positioner has detected a leak in the actuation assembly. Leakage from the actuator can cause decreased responsiveness and excessive air/gas consumption. Low supply pressure can also trigger this warning.	Repair pneumatic leaks at the tubing junctions and actuator seals. Ensure proper supply pressure. See DTM screen: Health Status/Actuator Health. This indicator can be disabled.
YRYG	FRICITION HIGH WARNING (user set) indicates the valve/actuator friction has passed the user set limit. High friction can cause loop oscillations, poor position control, jerky motion, or valve sticking. It can be caused by build-up from the process on the stem, trim or seat, by a failing bearing or guides in the valve and actuator, galling of the trim or stem, excessively tightened packing, linkages, or other valve/actuator mechanical issues.	Determine if the friction is significantly interfering with the valve control. If not, consider increasing the friction warning limit. Consider the following to reduce friction: Stroke the valve to clear off build-up. Clear any external mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator. Highly localized friction or very jerky travel can indicate internal galling. Repair or replace internal valve components. See DTM screen: Health Status/Valve Health. This indicator can be disabled.
YRRY	ELECTRONIC INABILITY TO FAIL SAFE WARNING indicates that the piezo may be damaged. This may prevent the proper failure position upon loss of signal/power. This condition may occur briefly on an air-to-close valve that is held for long periods of time in the closed position, or and air-to-open valve held in the open position.	If alarm persists for more than 30 minutes, the Piezo assembly is damaged and should be replaced. This indicator can be disabled.
YRRR	PNEUMATIC INABILITY TO FAIL SAFE WARNING indicates that upon loss of air supply, the valve may not move to the fail-safe position. The spring alone is not adequate to overcome the friction and process load in the system. The failsafe spring may have failed, or it was not sized properly for the application. Friction or process load may have increased.	Check for high friction. Repair or replace actuator spring. Reduce process load. This indicator can be disabled.
RGGY	FEEDBACK READING PROBLEM DURING CALIBRATION ALARM indicates that during calibration, the range of motion of the position feedback arm was too small for optimum performance, or the position sensor was out of range.	Check for loose linkages and/or adjust the feedback pin to a position closer to the follower arm pivot to create a larger angle of rotation if the feedback rotation is less than 15 degrees for the total valve travel and recalibrate. Briefly pushing the quick-cal button acknowledges this condition and the positioner will operate using the current short stroke calibration if otherwise a good calibration. If the condition does not clear then adjust the positioner mounting, linkage or feedback potentiometer to move the position sensor back into range then restart the calibration. This error may be cleared by briefly pushing the quick-cal button, which will force the positioner to use the parameters from the last good calibration.
RGGR	INNER LOOP OFFSET TIME OUT ALARM during calibration the Inner Loop Offset value did not settle. This could result in less accurate positioning.	Repeat the stroke calibration to get a more accurate ILO value. To proceed using the less accurate ILO value, this error may be cleared by briefly pushing the quick-cal button. Lowering the gain setting may help if the actuator is unstable during the calibration. Gain settings can be physically adjusted on the device. A lower letter represents lower gain.
RGYG	NON-SETTLE TIME OUT ALARM indicates that during calibration, the position feedback sensor did not settle.	Check for loose linkages or a loose positioner sensor. This error may be cleared by briefly pushing the quick-cal button, which will force the positioner to use the parameters from the last good calibration. This error may appear on some very small actuators during the initial calibration. Recalibrating may clear the problem.

Blink Code	Description	Recommendations
RGYY	NO MOTION TIME OUT ALARM indicates that during calibration, there was no motion of the actuator based on the current stroke time configuration.	Check linkages and air supply to make sure the system is properly connected. If the time out occurred because the actuator is very large then simply retry the Quick cal and the positioner will automatically adjust for a larger actuator by doubling the time allowed for movement. This error may be cleared by briefly pushing the quick-cal button, which will force the positioner to use the parameters from the last good calibration.
RGRR	FACTORY RESET STATE indicates the unit has had a factory reset and has not yet been calibrated. The unit will not respond to commands and will remain in the failsafe position until a calibration is successfully completed.	Calibrate. Proper Valvesight operation will require stroke, actuator, and friction calibration to be completed. This indicator can be disabled.
RYYG	SUPPLY PRESSURE LOW ALARM (user set) indicates that the supply pressure is below the user set alarm limit. Low supply pressure can cause poor valve response or positioner failure. The minimum recommended supply pressure is 30 PSI (2.1 bar) for proper operation. The unit will fail at less than approximately 17 PSI (1.2 bars). Low supply pressure indications can also be caused by pneumatic leak.	Regulate the supply pressure at the positioner above 30 PSI (2.1 bar). Recalibrate pressure sensors. Ensure system air/gas supply is adequate. Repair kinked supply tubing. Check the pressure sensor board connections and replace pressure sensor board if necessary. Check for pneumatic leaks in the actuator and actuator tubing. See DTM screen: Health Status/Actuator Health.
RRGG	PILOT RELAY RESPONSE ALARM (user set) indicates that the pilot relay is sticking or extremely slow to respond. This affects the responsiveness, increases the chance of limit cycling and excessive air consumption. The pilot relay consists of the driver module assembly with piezo (I-P relay) which is coupled to the spool valve. Delayed response can be caused by a partially clogged piezo or debris, oil, corrosion, or ice on the spool, or low supply pressure.	Check response of the valve. If OK, adjust Pilot Relay Response limits. Check the supply pressure. Check the spool for debris, oil, corrosion, ice on the spool. Clean or replace the spool assembly. Replace the piezo or driver module assembly. Maintain a clean, water-free air/gas supply. See DTM screen: Health Status/Positioner Health. This indicator can be disabled.
RRGY	FRICTION LOW ALARM (user set) indicates the friction has passed below the user set limit. The alarm indicates a more severe condition than the warning.	Check for a packing leak. Tighten or replace the valve packing. See DTM screen: Health Status/Valve Health. This indicator can be disabled.
RRGR	FRICTION HIGH ALARM (user set) indicates the valve/actuator friction has passed the user set limit. The alarm indicates a more severe condition than the warning. High friction can cause loop oscillations, poor position control, jerky motion, or valve sticking. It can be caused by build-up from the process on the stem, trim or seat, by a failing bearing or guides in the valve and actuator, galling of the trim or stem, excessively tightened packing, linkages, or other valve/actuator mechanical issues.	Determine if the friction is significantly interfering with the valve control. If not, consider increasing the friction warning limit. Consider the following to reduce friction: Stroke the valve to clear off build-up. Clear any external mechanical obstruction, loosen the packing, clean the stem, repair or replace the actuator. Highly localized friction or very jerky travel can indicate internal galling. Repair or replace internal valve components. See DTM screen: Health Status/Valve Health This indicator can be disabled.
RRYG	PIEZO VOLTAGE ALARM indicates the portion of the circuit board that drives the piezo is bad, or piezo valve itself is bad.	If the unit is functioning and controlling replace the piezo, if it does not operate replace the main circuit board. This indicator can be disabled.
RRYR	PILOT RELAY POSITION LIMIT ALARM indicates the pilot relay (spool) appears to be fixed at a limit and is not responding. This could be due to low supply pressure, a hall sensor that is out of calibration, a broken piezo, stuck spool, or a wire connection problem.	Check for adequate supply pressure. A hall sensor problem may be cleared by briefly pushing the quick-cal button, which will force the positioner to use the parameters from the last valid calibration. Check the internal wiring harnesses for good connections. Check the spool valve for sticking problems. If the positioner still does not operate replace the piezo, driver module assembly, and/or spool assembly.
RRRY	ELECTRONICS ERROR OR ALARM indicates the internal data was not updated correctly. This may affect the function of the positioner in various ways or not at all. This can be caused when intermittent operation occurs when connecting power.	Error may self clear with time. If error persists, cycle power and complete a Quick-Cal. If the error still persists, Check internal wiring and connectors for electrical shorts or opens. If no problems are found and alarm persists, replace the main circuit board.
RRRR	POSITION DEVIATION ALARM (user set) indicates the difference between the command and the actual position has been greater than the user-set limit for longer than a user-set time.	Review active alarms and warnings to find root causes of this alarm. See DTM screen: Alerts/Command Deviation. This indicator can be disabled.

TROUBLE SHOOTING

Logix 520MD Symptoms and Solutions		
Failure	Probable Cause	Corrective action
No LED is blinking	<ol style="list-style-type: none"> 1. Current source below 3,7 mA 2. Incorrect wiring polarity 	<ol style="list-style-type: none"> 1. Verify current source supplies at least 3,7 mA 2. Check wiring for correct polarity
Erratic communications	<ol style="list-style-type: none"> 1. Current source bandwidth not limited to 25Hz 2. Maximum cable length or cable impedance exceeded 3. HART modem connected to PC RS-232 port not receiving enough power 4. Interference with I.S. barrier 5. Current source stripping (filtering) HART signal 	<ol style="list-style-type: none"> 1. Maximum allowable current source rate of change is 924 mA per second 2. Check cable conductor size, length and capacitance. Refer to 'Cable Requirements' on page 11. 3. Verify laptop battery is not low 4. Must use HART compatible I.S. barrier 5. Use the HART filter (VHF) available from Flowserve (FLS part-No. 10156843) Alternatively a 250Ω and a 22 μF capacitor, installed according to the following schematic drawing can be used to establish communication 
Unit does not respond to analog commands	<ol style="list-style-type: none"> 1. Unit is in digital command mode 2. Error occurred during calibration 	<ol style="list-style-type: none"> 1. Switch to analog command mode with ValveSight DTM software or handheld communicator. 2. Correct calibration error. Recalibrate
Valve position reading is not what is expected	<ol style="list-style-type: none"> 1. Stem position sensor mounting is off 180 degrees 2. Stroke not calibrated 3. Tight shutoff MPC (Minimum position cutoff) is active 4. Custom characterization or soft stops active 	<ol style="list-style-type: none"> 1. Reposition sensor 2. Calibrate stroke 3. No action 4. No action
Position is driven fully open or closed and will not respond to command	<ol style="list-style-type: none"> 1. Stroke not calibrated 2. Inner-loop hall sensor not connected 3. Wrong air action entered in software 4. Actuator tubing backward 5. Electro-pneumatic converter malfunctioning 6. Control parameter inner-loop offset is too high/low 	<ol style="list-style-type: none"> 1. Calibrate valve stroke 2. Verify hardware connections 3. Check ATO (Air-to-open) and ATC (Air-to-Close) settings. Recalibrate 4. Verify ATO/ATC actuator tubing 5. Replace electro-pneumatic converter 6. Adjust inner-loop and see if proper control resumes
Sticking or hunting operation of the positioner	<ol style="list-style-type: none"> 1. Contamination of the electro-pneumatic converter. 2. Control tuning parameters not correct 	<ol style="list-style-type: none"> 1. Check air supply for proper filtering and meeting ISA specifications ISA-7.0.01 2. Lower proportional gain settings



Exploded drawing for spare parts

SPARE PARTS KITS

Item No.	Description	Part-No.
1	Cover Assembly	Yellow
		White
		Black
3	Relay Module Assembly: -20°C to 85°C (-4°F to 185°F)	255240.999.000
	Relay Module Assembly: -40°C to 85°C (-40°F to 185°F)	218771.999.000
4	Repair kit for Potentiometer Assembly	218772.999.000
5	Position Feedback Assembly	230103.999.000
8	Follower Arm Assembly	218773.999.000
		218774.999.000
		Max. stroke 65 mm
		Max. stroke 110 mm

Mounting Kits

	Description	Part-No.
-	IEC 534 part 6 (FloTop, Kämmer KA, Kämmer KP, and standard NAMUR linear valves)	213619.999.000
-	Rotary VDI/VDE 3845 (DIN ISO 5211)	188151.999.000
-	Flowserve direct mounting	214004.999.000
-	Linear VDI / VDE 3847	255242.999.000