

SMART SERVO PUMP - SSP

Drive model: D-MP series 20 or higher	Pump models: PGI PGI2 PGIX2	Servomotor model: PMM
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IDENTIFICATION

SSP and drive

SSP label : L1

Drive label : L2

Pump and servomotor

Pump label : N1

Servomotor plate : N2

1 : SSP system code
2 : SSP system main data
3 : SSP system serial number

4 : drive code
5 : drive serial number
6 : factory firmware version
7 : drive main data

7 : pump serial number
8 : pump code
9 : pump internal code Atos
10 : pump rotation direction

11 : servomotor code
12 : servomotor main data

PROGRAMMING TOOLS - not included

Programming PC software	AND	RS485 adapter/cables	Sizing tool PC software
S-SW-SETUP		KIT S-A-PS-USB/DB9	S-SW-SIZING

REMARK Atos PC software are designed for Windows based operative systems - Windows 7 SP1 or later

PROGRAMMING PC SOFTWARE

S-SW-SETUP	supports	NP (Serial RS485) BC (CANopen) EH (EtherCAT)	BP (PROFIBUS DP) EP (PROFINET RT/IRT)
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PC SOFTWARE DOWNLOAD

Download PC software at www.atos.com accessing to "MyAtos -> Download area electronics"

Free registration by filling the form at www.atos.com/en-it/login

S-SW-SETUP and S-SW-SIZING are free and available in Download area

RELATED DOCUMENTATION - www.atos.com

AS050 Basic for Smart servopumps - SSP - tech. table	S-MAN-SW Programming software instructions manual
AS100 Smart servopumps - SSP - tech. table	S-MAN-HW Installation instructions manual
AS200 Sizing criteria for servopumps - tech. table	S-MAN-S-BC CANopen protocol programming manual
AS300 Cast iron internal gear pumps - tech. table	S-MAN-S-BP PROFIBUS DP protocol programming manual
AS320 Cast iron double internal gear pumps - tech. table	S-MAN-S-EH EtherCAT protocol programming manual
AS350 Aluminium internal gear pumps - tech. table	S-MAN-S-EP PROFINET protocol programming manual
AS400 Electric motors for SSP servopumps - tech. table	
AS500 Electronic drives for SSP servopumps - tech. table	
AS800 Programming tools - tech. table	
AS810 Accessories for SSP servopumps - tech. table	
AS910 Operating and maintenance info - tech. table	

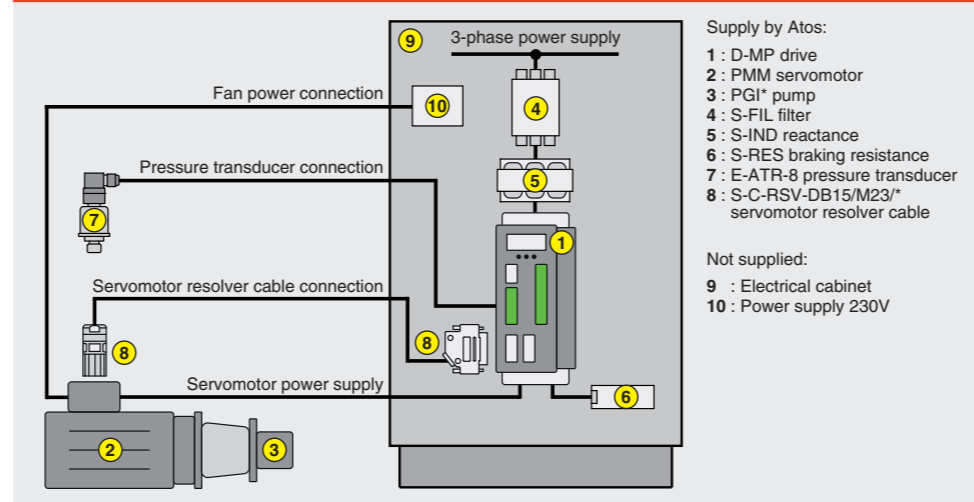
ATTENTION !

The purpose of this quickstart guide is show a logical sequence of basic operations. This guide does not cover all details or variants of Atos servopumps. All operations described in this document should be performed only by qualified personnel. Operations and images could be subject to change without notice. For further information please refer to related documentation.

CONTACT US

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LOGIC BLOCK DIAGRAM - SSP SYSTEM



INSTALLATION		PROGRAMMING
STEP 1	STEP 2	STEP 3
RECOVERY / REGENERATION	ELECTRICAL	SOFTWARE

STEP 1 RECOVERY / REGENERATION - PROCEDURE AFTER STORAGE

Drive cannot be used immediately after a storage period. In order to avoid faults during activation, the following procedures must be adopted (for more information please refer to S-MAN-HW manual).

RECOVERY

Leave the drive for 4 hours as indicated:

Temperature	0 ÷ 35 °C
Humidity	5 ÷ 75 %
Condensation	NO
Atmospheric pressure	61.6 ÷ 101.3 kPa
Recovery time (1)	4 h

(1) After this recovery time there must be no trace of condensation, both inside and outside (well ventilated area)

REGENERATION

Only mandatory if the time elapsed since the last regeneration of electronic capacitors is between 6 and 12 months: power on the drive through L1, L2, L3 and X3 or X1-IN terminals for 2 h, without giving run enable. Once the regeneration process is completed, the drive can work normally.

WARNING: the regeneration procedure of the power bus electrolytic capacitors given above is no more valid if:

- the time elapsed since the last regeneration is greater than 12 months
- the time elapsed since purchase is longer than 12 months and the regeneration procedure has never been carried out

In these cases request the procedure to be used at Atos

STEP 2 ELECTRICAL

This section considers the different SSP models, illustrating the multiple variants of the available electrical connections. The electrical connections have to be wired according to the selected SSP code.

WARNING: remove power supply before any electrical or wiring operations

2.1 MAIN CONNECTIONS - DRIVE

Drive type: 022 - 032 - 046 - 060

Drive type: 090 - 100 - 140 - 165 - 210

Power connections - all drive types

L1	Drive power supply - input
L2	
L3	
U	Servomotor power supply - output
V	
W	
+	Brake resistor connection
F	
PE	Connection PE and shield

(*) type of BUS2 connectors change according to the fieldbus interface

BUS2 PROFIBUS DP (BP)

IN Ethernet (EH, EP)

BUS2 Ethernet (EH, EP)

2.2 CONNECTORS - DRIVE

Recommended LiYCY shielded max conductor size 1,5 mm²
1,5 mm² max 30 m - for 24VDC power supply - 0,5 mm² max 30 m - for logic

IN/OUT digital and analog signals		CANopen (BC) - main - always present (not use for NP, BP, EH, EP)	
M1	1 DI1 (Enable 24Voc or disable 0Voc) - digital input 2 DI2 (Multiple axis selection IN0) - digital input 3 DI3 (Multiple axis selection IN1) - digital input 4 DI4 (Alarm reset) - digital input 5 DGND (Common gnd for digital input) 6 DO1 (1) (Fault 24Voc or normal working 0Voc) - digital output 7 DO1-24V (DO1 power supply 24Voc) - input power supply 8 DO2 (2) (For SSP without /D option) (STO test suggested 24Voc or not 0Voc) - digital output 9 DO2 (2) (For SSP with /D option) (Smart cooling active 24Voc or not 0Voc) - digital output 10 DO2-24V (DO2 power supply 24Voc) - input power supply 11 Q_INPUT- (±10Voc or 4 + 20mA) - analog input 12 Q_INPUT+ (5) (Default is 0 + 10Voc) 13 AGND (Common gnd for Q_MONITOR) 14 +10V (power supply +10Voc) - output power supply 15 -10V (power supply -10Voc) - output power supply 16 Q_MONITOR (±10Voc / 10V = 3276,7 rpm) - analog output	M4-2 (3)	1 CAN_HA (Bus line - high) 2 CAN_LA (Bus line - low) 3 CAN_GND (signal zero data line)
IN/OUT digital and analog signals - P/Q control connections		CANopen (BC) - always present (not use for NP, BP, EH, EP)	
M3	1 DI1 (Enable 24Voc or disable 0Voc/PQ) - digital input 2 DI2 (Pressure smart tuning selection IN0) - digital input 3 DI3 (Pressure smart tuning selection IN1) - digital input 4 DI4 (not used) - digital input 5 DGND (Common gnd for digital input) 6 DO3 (1) (Smart maintenance alert 24Voc or not 0Voc) - dig. out. 7 DO3-24V (DO3 power supply 24Voc) - input power supply 8 DO4 (2) (STO computed 24Voc or not 0Voc) - digital output 9 DO4-24V (DO4 power supply 24Voc) - input power supply 10 AGND (Common gnd for P_MONITOR) 11 P_INPUT- (±10Voc / 4 + 20mA) - analog input 12 P_INPUT+ (5) (Default is 0 + 10Voc) 13 AGND (Common gnd for transducer signal) 14 TR1 (5) (±10Voc / 4 + 20mA) - analog input 15 P_MONITOR (±10Voc / 10V = 819,2 bar) - analog output	M4-3 (3)	1 CAN_HB (Bus line - high) 2 CAN_LB (Bus line - low) 3 CAN_GND (signal zero data line)
Not used - only for GND and SHIELD connection		PROFIBUS DP (BP)	
M2	1 DI1 (do not connect) 2 DI2 (do not connect) 3 DI3 (do not connect) 4 DI4 (do not connect) 5 GND (Common gnd) 6 SHIELD (Shield)	BUS2 (4)	1 SHIELD (do not connect) 2 NC (do not connect) 3 LINE_B (Bus line B) 4 DE (control's signal for repeater) 5 DGND (Data line and terminator signal zero) 6 +5V (Termination supply signal) 7 NC (do not connect) 8 LINE_A (Bus line A) 9 NC (do not connect)
24VDC input power supply - only for drives type 022 ÷ 060		Ethernet (EH, EP) - IN/OUT	
X3	1 V+_IN (Power supply 24Voc) - input power supply 2 V0_IN (Power supply 0Voc) - gnd power supply	BUS2 (4)	1 TX+ (Transmitter) - white/orange 2 RX+ (Receiver) - orange 3 TX- (Transmitter) - white/green 4 NC (do not connect) 5 NC (do not connect) 6 RX- (Receiver) - green 7 NC (do not connect) 8 NC (do not connect)
24VDC input power supply - only for drives type 090 ÷ 210		24VDC input power supply - only for drives type 090 ÷ 210	
X1-IN	1 V+_IN (Power supply 24Voc) - input power supply 2 V0_IN (Power supply 0Voc) - gnd power supply	X1-OUT	1 V+_OUT (Power supply 24Voc) - input power supply 2 V0_OUT (Power supply 0Voc) - gnd power supply

- DO1 and DO3 digital output with fast contact
- DO2 and DO4 digital output with relay contact
- Into the control board is present a dip-switch to insert the resistor termination (120 ohm) between CAN_H* e CAN_L*.
For more information about setting CANopen dip-switch, please refer S-MAN-HW manual
- Perform the cables connection following the IN and OUT indications

WARNING: input signals can be reconfigured between voltage and current using specific dip-switch present inside the drive; set the dip-switch with the drive powered off and before making the electrical connections as it would not be possible to remove the cover with connectors wired (see S-MAN-HW installation manual)

Safe Torque Off (STO)

S1	1 +24V_STO1 (Power supply STO1 - 24Voc) - input power supply
	2 0V_STO1 (first safety system channel)
	3 NC (do not connect)
	4 +24V_STO2 (Power supply STO2 - 24Voc) - input power supply
	5 0V_STO2 (second safety system channel)

WARNING:

- the STO function must be tested periodically as indicated in the S-MAN-HW manual to avoid the servomotor control is automatically disabled
- if the STO function is not used, both channels +24V_STO1 and +24V_STO2 must be permanently connected to the 24V voltage
- even if the STO function is not used, it is still necessary to periodically test the STO function
- the STO1 and STO2 inputs must have a dedicated +24VDC feed line and given with a delay respect the auxiliary +24VDC voltage of X3 (consider for example a time of 1s); is not possible to connect together in parallel the STO1 and STO2 inputs with the X3 feed line: this kind of wiring could cause failures on STO operations

2.3 MAIN CONNECTIONS - MOTOR

Power connection - 4 phases

C1	W Phase W	Input - power supply
	V Phase V	Input - power supply
	U Phase U	Input - power supply
	⊥ GND	Gnd - power supply

Fan power connection

C2	1	Fan	Input - power supply
	2		230 V @ 50 ÷ 60 Hz

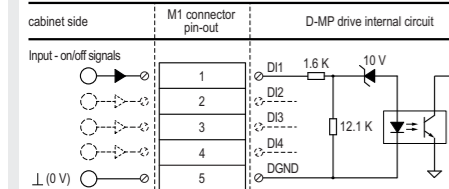
SERVOMOTOR RESOLVER CABLE CONNECTION

S-C-RSV-DB15/M23* 20 cable

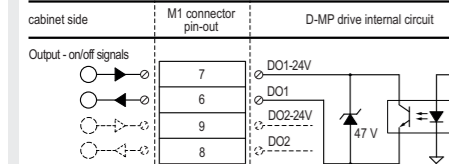
ELECTRICAL WIRING EXAMPLES

M1 CONNECTOR - DIGITAL / ANALOG SIGNALS

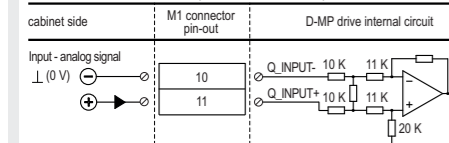
DIGITAL INPUT - DI1 (ENABLE or DISABLE)



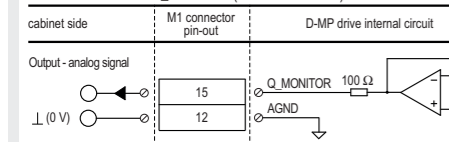
DIGITAL OUTPUT - DO1 (FAULT or NORMAL WORKING)



ANALOG INPUT - Q_INPUT (FLOW REFERENCE)

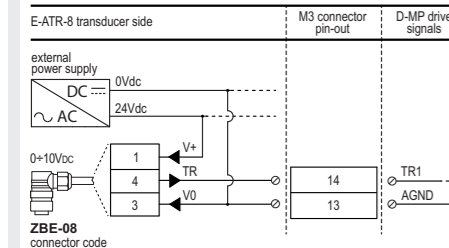


ANALOG OUTPUT - Q_MONITOR (FLOW MONITOR)



M3 CONNECTOR - PRESSURE TRANSDUCER

VOLTAGE



CURRENT

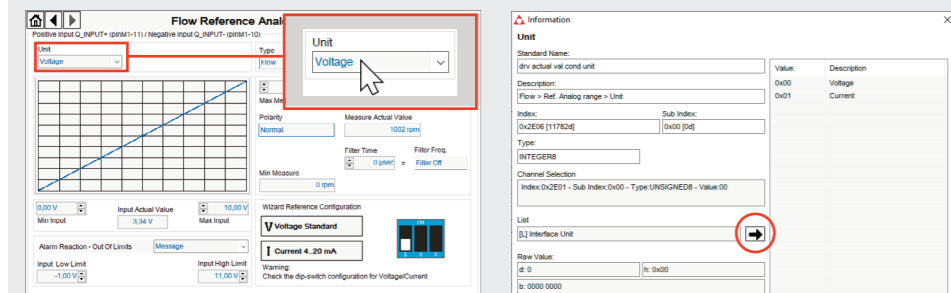


HINT ! - Wizard objects dictionary - only for BC, BP, EH, EP

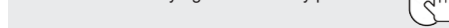
Press **CTRL + H** on the PC keyboard to open the context help form

Move arrow on parameter (e.g. **Unit**) to display the objects dictionary information to access the parameter via fieldbus

If present **List**, press **→** to display values accepted by the parameter

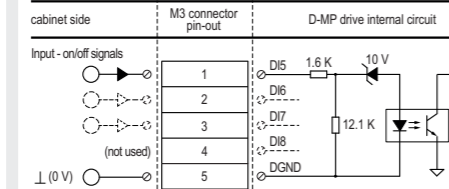


NOTE: alternatively right click on any parameter

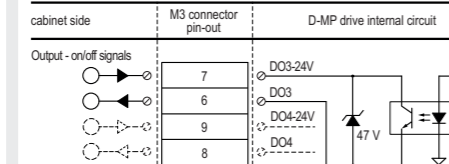


M3 CONNECTOR - DIGITAL / ANALOG SIGNALS

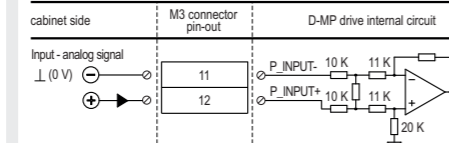
DIGITAL INPUT - DI5 (ENABLE or DISABLE P/Q CONTROL)



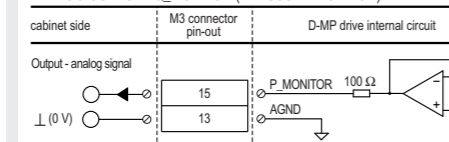
DIGITAL OUTPUT - DO3 (SMART MAINTENANCE ALERT or NOT ALERT)



ANALOG INPUT - P_INPUT (PRESSURE REFERENCE)



ANALOG OUTPUT - P_MONITOR (PRESSURE MONITOR)



STEP 3 SOFTWARE

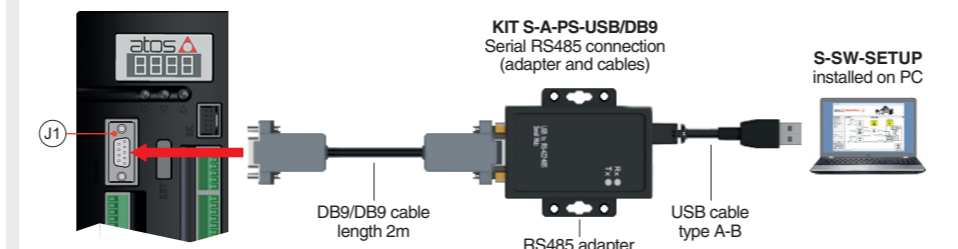
REMARK D-MP drives are factory preset with default parameters, only few programming operations are mandatory:

- perform the **Smart Start-up** procedure (highly suggested)
 - only for drives with fieldbus interface (**BC, BP, EH, EP**) setup the network parameters and the source of reference signals
- Drive programming can be performed through S-SW-SETUP software or via fieldbus (not for **NP**)

3.1 CONNECTION

- In order to access SSP parameterization:
 - Install S-SW-SETUP software on PC
 - Connect drive and power on with 24Vdc input power supply

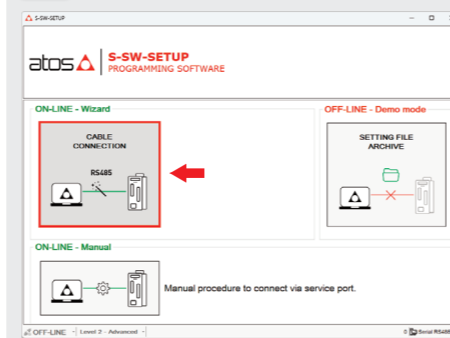
- Connect drive to the PC as shown below via serial port RS485



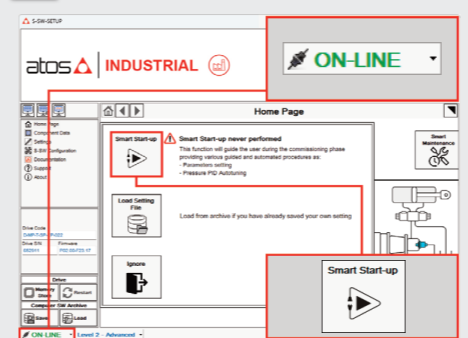
- Launch the software using S-SW icon:
 - software does **NOT** detect valid connection communication is not established, please follow wizard procedure

- software detects valid connection communication automatically established - SSP is **ON-LINE** see

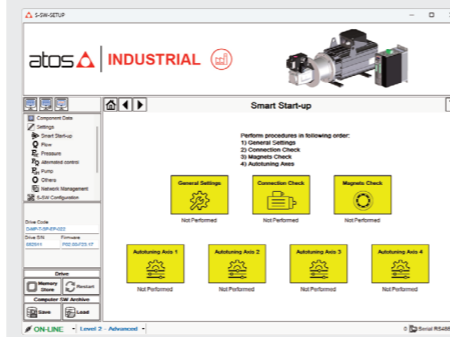
- In **ON-LINE** - Wizard press button **CABLE CONNECTION**



- Communication established and SSP is **ON-LINE** Press button **Smart Start-up**



- The Smart Start-up procedure is highly suggested in order to easily optimize the SSP systems.



REMARK: even if a setting file is loaded from the archive, the drive cannot be enabled until **Connection Check** and **Magnets Check** are performed

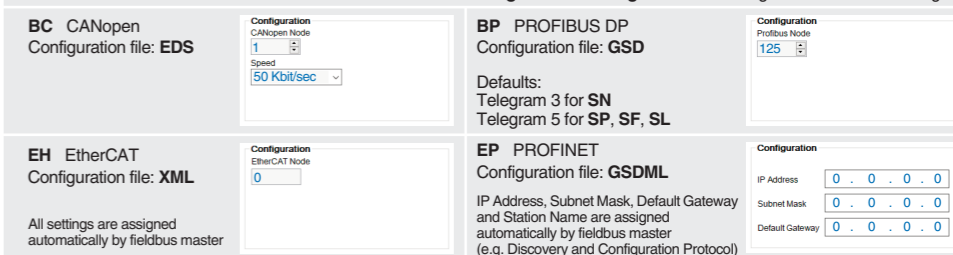
NOTE: Smart Start-up allows to optimize parameters for up to 4 axes

	Setting File not loaded from archive	Setting File loaded from archive
General Settings	RECOMMENDED	DO NOT PERFORM
Connection Check	MANDATORY <ul style="list-style-type: none"> STO digital inputs high (24V) Enable signal low (0V) Vent the pump delivery line 	MANDATORY <ul style="list-style-type: none"> STO digital inputs high (24V) Enable signal low (0V) Vent the pump delivery line
Magnets Check	MANDATORY <ul style="list-style-type: none"> STO digital inputs high (24V) Enable signal low (0V) Vent the pump delivery line 	MANDATORY <ul style="list-style-type: none"> STO digital inputs high (24V) Enable signal low (0V) Vent the pump delivery line
Autotuning Axis 1	NOT MANDATORY <ul style="list-style-type: none"> STO digital inputs high (24V) Enable signal low (0V) 	DO NOT PERFORM

3.2 FIELDBUS - Network Management - only for BC, BP, EH, EP

Node, Station Alias, IP Address, Baudrate, etc... can be set through:

- Machine central unit (master)** - please refer to S-MAN-S-** fieldbus protocol programming manual
- S-SW-SETUP software**
 - switch to **Level 2 - Advanced** and browse to **Network Management - Configuration** to change below default settings:

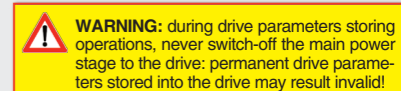


- press **Memory Store** button and in **Fieldbus Parameters** press **Store User** button to save new setting into the drive (see 3.3)
 - network configuration settings will be applied at next drive power-on or pressing the **Restart** button
- NOTE:** configuration files are available in MyAtos area - www.atos.com

3.3 STORE

Parameters modifications will be stored into drive permanent memory:

- press **Memory Store** button to access **Drive - Memory Store** window
- press **Store User** buttons to store **Drive Parameters**



3.4 BACK UP

Parameter modifications will be saved into PC memory:

- press **Save** button to access **Computer SW Archive - Setting Files** page, **Setting File Name** pop-up appears
- input a valid name into **Description** field and press **Ok** button

TROUBLESHOOTING

Pump noise

- presence of air; allow the SSP to run at low speed (<300rpm) flushing the oil through a relief valve present in the system and set at the lowest possible pressure; the pressure reference signal to the SSP should be higher than the relief valve pressure set

SSP does not follow the reference signal

- 3-phase power supply not correctly connected - verify the 3-phase power supply
- drive is powered off - check that the 24V power supply is present on X3 connector (only for size 022, 032, 046, 060)
- Connection Check and/or Magnets Check procedure not performed - see STEP 3, section 3.1 (point 6)
- STO function not enabled - check that the 24V supply is present on STO pins (S1 connector)
- drive is disabled - check that the 24V supply is present on enable pin (M1 connector)
- wrong connection of the pressure transducer to the drive - check wiring connection
- system relief valves wrong setting - verify relief valves setting
- suction line wrongly connected - verify suction pipe

PC software parameters modifications are lost when drive is switched off

- parameter store operation was not performed, check store procedure - see STEP 3, section 3.3

PC software parameters modifications have no effect on the drive

- drive is OFF LINE, check connection procedure - see STEP 3, section 3.1

Maintenance request

- maintenance of the pump and/or motor is required; these information are accessible via digital signals (DO3 - M3 connector) and/or fieldbus - follow Smart Maintenance instruction via the S-SW-SETUP software and the S-MAN-SW manual

HINT! - The alarms code are shown on the drive display (see the table below for typical alarms and corrective actions)

Code	Description	Corrective Actions
A10.0 plus	DC Bus Voltage too Low	If the start-up sequence is not correctly executed each time the SSP is switched on, alarms A10.0 and A13.1 will be activated simultaneously. <ol style="list-style-type: none"> Turn on the 3-phase power supply and give 24Vdc input power supply Wait a minimum of 200 ms and give the 2 STO digital inputs (S1 connector). Attention: the 2 inputs must be given with a delay <50ms Give the enable signal (M1 connector) Give the reference signals (M1 and M3 connectors)
A13.1	STO function enable	<ol style="list-style-type: none"> Reduce the speed reference signal <2000 rpm during the phase of the machine cycle where the alarm is generated Check motor cables conditions and verify motor insulation If the problem persists contact Atos service Center NOTE: A3.0 alarm cannot be reset either by logic input, or via serial or via fieldbus - it is necessary to restart the drive
A3.0	Drive Output Current Value too High	<ol style="list-style-type: none"> Check the 3-phase power supply Verify the Start-up sequence - see STEP 3 If the problem is still present add / increase the ramp time on the increasing speed reference signal If the problem persists contact Atos service Center
A10.0	DC Bus Voltage too Low	<ol style="list-style-type: none"> Check the 3-phase power supply Verify the Start-up sequence - see STEP 3 If the problem is still present add / increase the ramp time on the decreasing speed / pressure reference signal If the problem persists contact Atos service Center
A11.1	DC Bus Voltage too High	<ol style="list-style-type: none"> Check the braking resistance is correctly connected If the problem is still present add / increase the ramp time (0,25s should be enough) on the decreasing speed / pressure reference signal If the problem persists contact Atos service Center
A12.1	Run without Power Soft Start	Introduce a delay from the PLC between power on and command enable
A13.2	DC Bus Ripple too High	<ol style="list-style-type: none"> Reduce the speed reference signal Check the load In extreme cases check speed loop If the problem persists contact Atos service Center
AT2	Pressure Transducer Out of Limits	Check the pressure transducer connection