AscoPosCom Program
HELP FILE

Version 1.0



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This is the help file for ASCO/JOUCOMATIC's *APC* program from version 1.xx upwards.
This software only works with the Positioner^{D} valve controller firmware version 14 or greater.

MINIMUM SYSTEM REQUIREMENTS:
Pentium II, 800 MHz, 32 Mbyte RAM, Windows 9x/Windows 2000/Windows NT 4.0

1. INSTALLATION PROCEDURE

Insert the CD-ROM.
From the Windows® Start menu, click Run... In the Open field type:
Start in the directory \Asco Pos Com Vxx \ APC-Vxx-English the file "Setup.exe" to install the English version.
Start in the directory \Asco Pos Com Vxx \ APC-Vxx-German the file "Setup.exe" to install the German version.
Start in the directory \Asco Pos Com Vxx \ APC-Vxx-French the file "Setup.exe" to install the French version.

Follow the instructions on the screen.

1.1 GETTING STARTED

Choose in the Windows® Start menu "Programs" – "Asco Joucomatic GmbH" – "Asco Pos Com Vxx language" and click on "Asco Pos Com".

1.2 HOW TO CONNECT THE POSITIONER^{D}

Unscrew the cover the positioner and connect the RS232 adapter (part no: 881 00 732) into the valve's communication port. Connect the 9-pin Sub-D connector into the serial port of your PC.
Select the appropriate serial port from the Project/Serial Port menu.
This selection is stored inside your PC.

1.3 GENERAL RECOMMENDATIONS

Do not open the *APC* program more than once. Only one application (.exe) can control the serial port!
Do not start the *APC* program from the CD. Use the installation procedure to have a full installation of the software. Only the hard drive will provide sufficent speed.
If you use the Scope function, it may be helpful to close other time-consuming applications so the necessary resources are available.

2. HOW TO OPERATE THE *APC* PROGRAM

2.1 HOT KEYS

F1	Displays the Help window on the screen.
F3	Displays the Scope Function Settings dialogue box (data acquisition).
F4	Starts data acquisition and updates the on-screen scope graph.
F5	Stops data acquisition and freezes the scope graph for detailed analysis.
F10	Resets the zoom factor to the default.
Alt+F4	Exits the *APC* program

2.2 MAIN MENU

Project – Parameters – Diagnosis - Scope - ?

2.2.1 PROJECT MENU

You can save your current valve parameters and the current scope graph in a project file.

2.2.1.1 NEW PROJECT… (*unknown*.APC)

Creates a new project. Please enter the file name without extension. The file name extension is forced to *.APC. All other field entries (version, address etc.) are optional.
Note:
Use Save Project to save your own "Scope/Setup" in the file "*unknown*.APC".
After restarting the *APC* program, select Open Project to open the "*unknown*.APC" file and restore your scope settings.

2.2.1.2 OPEN PROJECT… (*.APC)

Opens an existing project from the directory in which you last saved it.
You can switch to a different directory by using the standard Windows dialogue.

2.2.1.3 SAVE PROJECT (current project, current path)

Saves the current project together with its parameters, status information, current graphs and scope settings in the current path.

2.2.1.4 SAVE PROJECT AS… (*.APC)

Saves the project with a new file name in the directory of your choice.
Enter the file name without extension. The file name extension is forced to *.APC.

2.2.1.5 PROJECT INFO

Allows you to edit the project information such as Project name; Project version, Name; Address; City; Phone/Fax; Email

2.2.1.6 PRINT PROJECT…

Prints the project to the default Windows printer.

All:	Prints project info, parameters and scope graphs.
Parameters:	Prints project info and factory or customer parameters as selected.
Scope view:	Prints project info, scope graphs and scope setup.

2.2.1.7 SERIAL PORT

Allows you to select the serial port to which your valve is connected.
The baudrate is automatically set at first start-up of communication with the valve.
Baudrates of 19200 and 57600 are available.

2.2.1.8 EXIT

Quits the *APC* program. If you have not saved your changes you will be prompted whether or not to save before exiting.

2.2.2 PARAMETER MENU

Control - Setpoint - Analog IN/OUT - Autosafe - Digital Input - Display/Keys - Digital Out - ERROR

2.2.2.1 PARAMETER SETTINGS

FACTORY	Reads the factory parameters from the valve. Factory parameters cannot be changed. These parameters are displayed in the grey parameter fields. If no parameters were read, the value "--" is displayed.
CUSTOM	Reads the custom parameters from the valve. These parameters are displayed in the grey parameter fields. If no parameters were read, the value "--" is displayed.

Note: Only Custom Parameters can be projected and written into the file. Factory parameters are fixed values that cannot be changed.

2.2.2.2 PROJECTED PARAMETERS / VALVE PARAMETERS

Clicking "Open Project…" will load the projected parameters from the project file and display them in the white parameter fields. If no project is opened, the default parameters are displayed.
You can also modify the projected parameters in the white fields and save them offline.

PARAMETER SETTINGS

FACTORY	Reads the Factory Parameters from the valve and displays them in the grey fields.
CUSTOM	Reads the Custom Parameters from the valve and displays them in the grey fields.
READ	Reads the Factory/Custom Parameters from the valve.
WRITE	Writes the Custom Parameters to the valve. When modifying parameters, keep to the order of read – copy – write.
COPY	Copies the Factory/Custom Parameters from the grey (valve) field into the white (project) field. Differences in the radio buttons between valve and project settings are highlighted in red.

Reading and writing can take up to 10 seconds.
If communication with the valve is interrupted or faulty, a "Communication Error" message appears.

CLOSE	Returns you to the Main Menu.

For a detailed description of the parameters, see "PARAMETERS" section.

Note:
Modifying custom parameters:
First "read" the Custom Parameters from the valve, then "copy" them into the project file (white fields) before you modify and "write" them. This prevents you from unintentionally changing parameters set for other groups.

Restoring custom parameters:
The initial Custom Parameters are identical to the Factory Parameters. If you wish to restore the initial Custom Parameters, copy the Factory Parameters into the project and write them as Custom Parameters to the valve.
Proceed as follows:

Click "Factory Parameter Settings" to read the factory parameters.
Click "Copy" to copy them into the project.
Click "Custom Parameter Settings" to switch to Custom Parameters.
Click "Save Project" or "Save Project As…" to temporarily store the factory parameters in the project.
Click "Open Project" to load the temporary project.
Click "Parameters/Write" to write the initial parameters as Custom Parameters to the valve.

It is good practice to always save your Custom Parameters in a project file (.APC) before changing parameter settings.

2.2.3 DIAGNOSIS MENU

Valve Info - Serial Setpoint - Test Function

2.2.3.1 VALVE INFO

READ VALVE INFO	Reads the actual valve information from the valve. If communication with the valve is interrupted or faulty, a "Communication Error" message appears.
OK	Returns you to the Main Menu.
CONTROLLER FIRMWARE	Shows the version of the valve firmware. Please indicate this version number when contacting our Product Support.
PART NUMBER	Shows the part number of the valve. Please indicate this part number when contacting our Product Support.
SERIAL NO.	Shows the serial number of the valve. Please indicate this serial number when contacting our Product Support.
PRODUCTION DATE	Shows week and year of production of the valve. This is important for warranty claims.

CALIBRATION DATE	Shows when the valve was last calibrated (production, service etc.).
CALIBRATION STATUS	On successful completion of calibration, a value of 255 is displayed.
CALIBRATION COUNTER	On completion of calibration sequence, a value of 255 is displayed.
TEMPERATURE CALIBRATION	Shows the ambient temperature during the calibration process.
TEMPERATURE VALVE	Shows the actual inside temperature of the valve electronics. In the event of an overtemperature alarm, this value is very high!

2.2.3.3 SERIAL SETPOINT

You can use this menu item to set a setpoint for start-up and maintenance.

SERIAL SETPOINT	Enter the desired setpoint in percent (%).
TRANSMIT	Click the "Transmit" button to send the setpoint you have selected to the valve. If communication with the valve is interrupted or faulty, a "Communication Error" message appears.
OFF	Click the "Off" button to disable the function. The valve switches back to the analog setpoint.
CLOSE	Returns you to the Main Menu. For security, this is only possible if the Serial Setpoint is "Off".

2.2.3.4 TEST FUNCTION

The test function is used for auto-testing during start-up and maintenance (continuous duty function).
Once the test function is activated, it is executed until it is disabled (OFF) or until the valve is powered off.

WRITE	Writes the Test Function and the Ramp/Step Time to the valve.
READ	Reads the Test Function and the actual Ramp/Step Time from the valve and displays the values on the screen. If communication with the valve is interrupted or faulty, a "Communication Error" message appears.
CANCEL	Returns you to the Main Menu. CAUTION: The test function remains active!

2.2.3.5 TEST MODE SELECTION

OFF	Test Function disabled.
RAMP	Continuous up and down ramping from 0 to 100% and back in a triangular wave.
STEP	Continuous up and down stepping between 0 and 100% and back in a square wave.
MULTISTEP	Setpoint is continuously increased in 10% steps from 0 to 100% and then decreased in 10% steps back to 0%.
RAMP/STEP TIME	Defines the time for increasing the ramp/step from 0 to 100% and decreasing the ramp/step from 100 to 0%. Defines the time in multistep mode for each 10% step.

2.2.4 SCOPE MENU

Setup – Start Acquisition – Stop Acquisition – Show Grid – Reset Zoom

2.2.4.1 SCOPE SETUP

MODES:

STEP MODE	Performs one step from "Setpoint Begin" to "Setpoint End" and displays the result in a graph. Note: The setpoint is controlled by the *APC* program.
RAMP MODE	Performs one linear ramp from "Setpoint Begin" to "Setpoint End" in the "Ramp Time" and displays the result in a graph. Note: The outlet setpoint is controlled by the *APC* program.
TRIGGER MODE	Performs like a digital oscilloscope. For details, see "Trigger" section. Note: The setpoint is controlled by the analog setpoint.
ACQUISITION TIME	Sets the size of the time scale.

TRIGGER:

CHANNEL	NONE (Roll mode)	No trigger condition. Continuous display of selected analog channels and 4 binary channels.
	ANALOG CHANNELS	Channel 1 to 4
	BINARY CHANNELS	Channel 1 to 4
SLOPE	Trigger on "rising" or on "falling" slope of the selected trigger channel.	
VALUE	Trigger value of the selected trigger channel (in percent).	
SAMPLE RATE	Sets the number of data sets to be transmitted per second. Maximum: 4 msec = 250 data sets per second. Minimum: 200 msec = 5 data sets per second. For Step/Ramp mode, the Sample Rate is fixed at 4 msec.	
ANALOG CHANNEL	Sets the transmitted and displayed channels.	
Analog Channel 1	Setpoint	(Standard)
	Analog In 2	
Analog Channel 2	Internal Sensor	(Standard)
	Analog In 2	
	PWM Out	Pilot valve 1
	PWM Out 2	Pilot valve 2
Analog Channel 3	Control Deviation	Difference between setpoint and feedback value
	PID Out	Sum of proportional+derivative+integral value
	Control Out	Sum of PID+forward control
	None	No signal is displayed for this channel
Analog Channel 4	P Value	Proportional value
	I Value	Integral value
	D Value	Derivative value
	Forward Control	Sum of forward offset + forward gain
	None	No signal is displayed for this channel
BINARY CHANNEL	Sets the transmitted and displayed channels.	
Binary Channel 1	Digital Output	see below
Binary Channel 2/3	Digital Output	Level of digital output (pressure switch window = default) The state is influenced by the Output Mode and the Output Source (see PARAMETERS)
	Shut Off	HIGH = The valve exhausts. LOW = Normal condition.
	Autosafe	HIGH = Autosafe alarm is enabled. LOW = Normal condition
	Limit Threshold	HIGH = Outlet pressure is above the limiting threshold + limit hysteresis. LOW = Outlet pressure is below the limiting threshold; see Parameters/Digital Output/Limit Size.
	Digital Input	HIGH = Input level above 11 volts LOW = Input level below 5 volts
	Range	HIGH = Setpoint is outside the 4...20 mA window; see Parameters/Error/Setpoint Range Detection

		LOW = Setpoint is inside the 4...20 mA window, or Out-Of-Range Detection is disabled.
	Error	HIGH = Error message according to error parameter setting; see Parameters/Error.
		LOW = No error or Error Select is disabled.
	Inlet Pressure	Not used.
		HIGH = Inlet pressure is below the Inlet Pressure Limit.
		LOW = Inlet pressure is above the Inlet Pressure Limit, or Inlet Pressure Limit is disabled.
Binary Channel 4	Digital Input	see above
MASTER/SLAVE	Selection is only possible if “cascaded control” is activated in the “Controller structure”.	

2.2.4.2 START ACQUISITION

Starts data acquisition.
If data acquisition is started in Step/Ramp mode, it is automatically stopped after the data acquisition time has expired.
In Roll mode, data acquisition has to be stopped manually by pressing the "Stop Acquisition" button.
In Trigger mode, data acquisition is started after the trigger condition is true and the graph is completed. Data acquisition is automatically stopped after the screen is filled (trigger is at 10% of the data acquisition time).

2.2.4.3 STOP ACQUISITION

Stops data acquisition manually in Roll mode and Trigger mode. You can stop data acquisition at any time. The readings are plotted in a scope graph and displayed on the screen.

2.2.4.4 SHOW GRID

Displays a time and amplitude grid on the screen.
To remove the grid, click "Show Grid" once again.

2.2.4.5 RESET ZOOM

Resets the zoom factor to the default set in Scope/Setup.
Clicking the "Zoom Back" button does the same.

2.2.4.6 GRAPHIC DISPLAY

Four analog channels and four binary channels are displayed along a time axis.
The time scale is set from Scope/Setup/Acquisition Time.
The time resolution (sampling points) for the Trigger Mode is set from Scope/Setup/Sample Rate.
For the Step/Ramp Mode, the sample rate is fixed at 4msec.
The graphic time resolution depends on the sample rate and the zoom factor.
The amplitude resolution of the analog channels is limited to 256 increments; this corresponds to 0.4% for the left axis and 0.8% for the right axis.

ZOOM IN
Move the mouse pointer over the analog section of the time graph. The mouse pointer changes to a magnifying glass. Press and hold the left mouse button to slowly draw a "window". The "window" must be located in the analog section. Wait until the pointer cursor changes back into a magnifying glass. Then release the left mouse button to zoom in on the window you have drawn.
Note: To zoom in on the time axis only, just draw a horizontal line.
ZOOM OUT
Click the "Zoom Back" button or press F10.

2.2.4.7 READOUT

The cursor readouts are displayed on the left side of the screen. The results are continually updated in the Roll mode.
As soon as the acquisition is complete, you can move the readout cursor to obtain a more detailed acquisition. Enter a new value in the Readout Time field and press the Return button. The value you entered is rounded off to a multiple of the sample time.

You can also move the cursor readout graphically: Place the mouse pointer on the arrow symbol. The pointer changes into a double-arrow. Press and hold the left mouse button. Move the cursor in the horizontal direction. Wait until the pointer changes into a double arrow, then release the mouse button. Your cursor readout is now in a new position.
Be sure to move the cursor slowly to allow the readouts to be updated.

3. INFO BAR

The Info Bar is located at the bottom of the screen.

PROJECT	Displays the Project Name as defined in the Project Info window.
FILE	Displays File Name under which the project was saved.
SETPOINT	Displays the actual setpoint setting (normal or custom). This information will only display if a valve has been connected and a Read Parameter or Read Status command has been used.
PARAMETER SET	Displays whether Factory Parameters (unchangeable) or Custom Parameters (changeable) are used.

4. PARAMETERS DESCRIPTION

4.1 CONTROL section

FORWARD OFFSET Fo (Option)
Not used for Positioner^{D}. Value is set to 0.

FORWARD GAIN Fg
Not used for Positioner^{D}. Value is set to 0.

PROPORTIONAL GAIN Kp
Control deviation Xd is "Xd = Setpoint W - Sensor value X".
The control output changes in proportion to the control deviation: Y = ... + (Kp * Xd).

DERIVATION TIME Td
The sensor value (feedback) is derivated, then multiplied with Derivation Time and subtracted from the control output [Y = ...+ Kp(Td * dXd/dt).
If you select Td=0 msec, derivation is disabled.

INTEGRATION TIME Ti
The control deviation Xd is integrated, then divided by Integration Time and added to the control output Y [Y = ... + (Time Integral Xd) / Ti].

INTEGRATION LIMIT IL (Option)
The integrator value is limited to avoid saturation.
It is limited to ±IL (in %). IL=100% gives maximum limitation; integration is disabled with IL=0%.

DEADBAND DB (Option)
If control deviation Xd is smaller than ±DB%, the position is held.

CONTROL STRUCTURE (Option)
Radio buttons are used to enable/disable parts of the control law and to get special control structures.
Control law (calculation of manipulated variable):
Control output Y = forward value + P value – D value + I value
Y = Fo + (Fg * W) + (Kp * Xd) + Kp(Td * dXd/dt) + (Time Integral Xd) / Ti.

PWM FREQUENCY (Option)
The proportional coil is controlled by a pulse-width-modulated (PWM) voltage. The PWM frequency can be modified within a range of 20 to 2000Hz. The PWM frequency is adapted to the valve's mechanics and should not be changed!

CONTROL CYCLE TIME
The control cycle time indicates the time intervals at which the control output (Y) is newly calculated.
Changes within a range of 1 to 100 msec are possible.
The cycle time is adapted to the control and the valve and should not be changed!

I VALUE
The I value determines what happens with the integrator (I value) when the control is in the “shut off” state.
There are two possibilities to avoid integrator saturation:

Hold: Integration value is maintained at the current value in the “shut off” state.
Reset: Integration value is reset to zero in the “shut off” state.

4.2 SETPOINT section

SETPOINT SIGNAL
Select the signal for the setpoint: 0-10 volt; 0-20 mA; 4-20 mA

SETPOINT DIRECTION
Select whether the rising setpoint increases the position (normal) or decreases position (inverse).

SHUT OFF
ON: If the setpoint is below the "shut off level", the coil current is switched off and the valve is fully exhausted.
OFF: Disables the shut off function. This function is needed for "Setpoint Adjustment/Custom".
Shut off level: Select a value between 0 and 10%.

SETPOINT ADJUSTMENT

Normal:	0 to 100% setpoint gives 0 to 100% outlet pressure.
Custom:	A setpoint between 0 and 100 % results in an outlet pressure between "offset" and "offset + span".
Setpoint Offset:	Select between -50% and +100%.
Setpoint Span:	Select between 50% and 150%.

SETPOINT SELECTION (Option)
You can choose between the standard "Setpoint 1" and an optional "Analog In 2".

RAMP FUNCTION

No Ramp:	Function disabled.
Rising Ramp:	"Ramp Rise Time" is used for increasing setpoints.
Falling Ramp:	"Ramp Fall Time" is used for decreasing setpoints.
Rising+Falling Ramp:	Combination of both ramp actions.

The ramp time (in seconds) is always related to a 0 to 100% setpoint step. This means the rise (slope) is constant.

4.3 ANALOG IN/OUT section

ANALOG OUT (option)
An analog output can be used to transmit the feedback signal or other internal control signals.

Note: Conversion from voltage output to current output must be made on the electronics (factory only).

Signal: Select the signal (0..10V/0..20mA/4..20mA)

Direction: Normal: 100% outlet pressure gives 100% current/voltage.
Inverse: 100% outlet pressure gives minimum current/voltage.

ANALOG IN 2 (option)
Feedback Select: Feedback control is made over the "Internal Sensor" or an optional "Analog In 2".
Signal: Select the signal (0..10V/0..20mA/4..20mA)
Direction Normal: 100% external sensor value gives 100% position.
Inverse: 100% external sensor value gives 0% position.

AUTO ZERO
Off: Function disabled.

4.4 AUTOSAFE section

AUTOSAFE
Off: Function disabled.
On: Autosafe enabled. This function is activated by "Overtemperature", "Overcurrent" or "Outside Window".

After the "delay time", the coil current is decreased in cycles to prevent overheating.

OVERTEMPERATURE (option)

Off:	Function disabled.
On:	If the electronics temperature rises above the "Temperature Limit" setting, Autosafe is activated until the temperature falls below this limit.
Temperature limit:	Values between 50 and 150 degrees celsius are allowed. Note: Values below 70 degrees celsius can cause Autosafe during normal operation! Autosafe is activated right just after the "delay time" has expired.

AUTOSAFE SOURCE (option)

Outside Window:	If the position is outside the "Digital Out/Window Size" setting, Autosafe is activated until the position is again within this window.

AUTOSAFE TIMING (option)

Delay time:	Select between 5-10-15-20-25-30-35-40 seconds.
Coil OFF Time:	If Autosafe is enabled, the coil current is limited to max. 70% for the period set in "Coil OFF Time" to prevent overheating.
Coil ON Time:	If Autosafe is enabled, the coil current is regulated for the "Coil ON Time".

4.5 DIGITAL INPUT section (option)

An optional "Digital Input" can be used to perform special functions.

SELECT POLARITY (option)

High Active:	If digital IN is "high", the function is enabled.
Low Active:	If digital IN is "low", the function is enabled.

SELECT FUNCTION (option)

Disabled:	Function inactive.	
Setpoint:	Manual/Setpoint1	Switches between manual operation and setpoint.
	Analog In 2/Setpoint1	Switches between two analog setpoints.
Feedback:	Analog In 2/Internal Sensor	Switches between internal and external sensor.
Outlet pressure:	Hold/Setpoint	Maintain outlet pressure or bring pressure to setpoint.
	Zero/Setpoint	Exhaust valve (0 bar) or bring pressure to setpoint.
	Max/Setpoint	Pressurise valve (inlet pressure) or bring pressure to setpoint.

4.7 DIGITAL OUT section

OUTPUT SOURCE (option)

Inside Window:	The digital output is enabled when the position is inside the window set in "Window Size".
Inside Window+Above Limit:	The digital output is enabled when the position is inside the window and above the "Limit Size".

Note: Above signals are "active good" signals.

ERROR:	An error signal is activated as defined in the "Error" section ("active bad" signal).
ERROR+Below Limit+Outside Window:	Combination of all active bad signals.

WINDOW DELAY

A short-term switchover into the inactive state is suppressed for the delay time (bounce suppression).
Select a value between 0 and 10 seconds.
The signal must stay in the "active" position for the complete delay time until the output changes to the active state. If the signal changes during the delay time, then the delay time is started again.

OUTPUT MODE

Normal:	The "Digital OUT" is high-active (active = 24 VDC).
Inverse:	The "Digital OUT" is low-active (active = 0 VDC)

WINDOW SIZE

The window is related to the setpoint and forms a symmetrical limit above and below the actual setpoint.
Example: 5% window and actual setpoint = 80%.

To be inside the window, the outlet pressure must be between 75% and 85%.
Select a value between 0 and 20%.

LIMIT THRESHOLD (option)
Checks whether the position is above the limiting threshold (output mode = normal) or below the limiting threshold (output mode = inverse).
Select values between 0 and 100%.

LIMIT HYSTERESIS (option)
Defines the "Limit Hysteresis" of the limit size. Serves to debounce the limit size. Select values between 0 and 10 %.

4.8 ERROR section (option)

ERROR SELECT (option)
Defines the source of the error signal.

Range: See Error/Setpoint Range Detection.

SETPOINT RANGE DETECTION (option)
If the setpoint range is set to 4..20mA (life zero), the input signal is checked to see whether it is inside this range.

Off:	Function disabled
>20mA:	Setpoint above 20 mA (control failure)
<4mA:	Setpoint below 4 mA (cable interruption)
>20mA + <4mA:	Checking for both conditions

ASCO/JOUCOMATIC