

rotork®

Process Controls

CVL Series

QuickStart Guide



Linear Control Valve Actuator

Established Leaders in Actuation Technology

Introduction

This QuickStart Guide covers the Linear control valve actuator range (CVL).

Models: CVL 500 & CVL 1500

Refer to Rotork PUB042-001-00 for full specification.

Building on Rotork's historical success with innovative technology, the CVL offers a highly accurate and responsive method of automating control valves without the complexity and cost of a pneumatic supply. With an increased focus on production costs and efficiency, accurate control of the process variable is paramount.

With resolution figures better than 0.1% and the ability to eliminate position overshoot, the Rotork CVA range helps to maximize product quality and plant capacity.

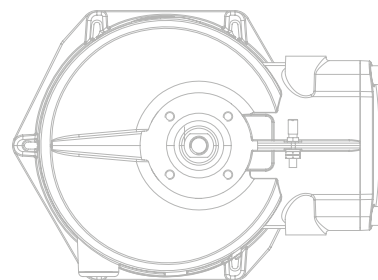
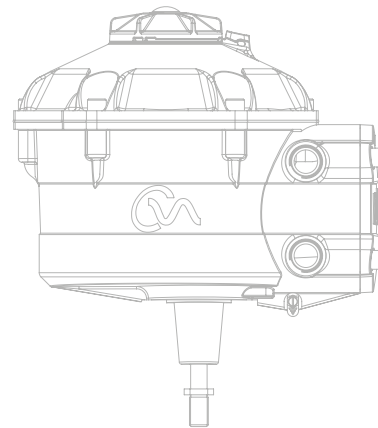
CVL range actuators are self contained, purpose designed and built for continuous remote electrical operation of control valves.

The actuator comprises:

- DC brushless electric motor.
- Reduction gearing with linear output shaft.
- Motor controller with speed, travel and thrust limitation.
- Electronic logic controls and monitoring facilities housed in a double sealed watertight enclosure.
- Hazardous area certification meeting international and national requirements.

All thrust and position settings as well as configuration of the actuator are made using a non-intrusive Bluetooth™ device, typically a PDA (not supplied).

Bluetooth™ PDA Enlight software is available for free download from www.rotork.com.



Installation & Setup Guide

Commissioning

Move the actuator selector knob to the 'STOP' position

Apply Electrical Power

On completion of the correct assembly and electrical connection procedures, the electrical power supply can now be applied to the actuator.

NOTE: If the unit is fitted with failsafe capacitors the Green or Red LED (depending on Mode selected) on the selector will flash until the capacitors are fully charged.

Movement is not possible whilst the LED is flashing.



Fig. 3.1

ESTABLISH Bluetooth™ COMMUNICATIONS

It is now required to establish communications in order to complete the fitting procedure.

Ensure Bluetooth is enabled on the PDA then click on the Enlight Icon to start the program.

The maximum range of Bluetooth communication is 10 Meters.

The first screen gives the option to connect to an actuator or open a saved file.

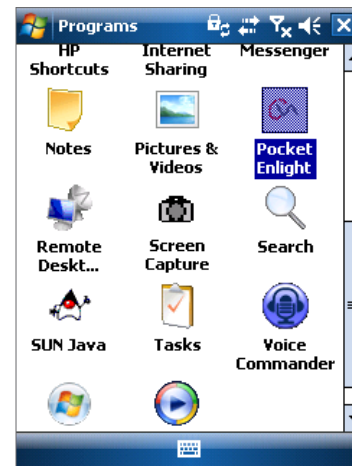


Fig. 3.2

WORK OFF LINE

If there is a configuration file stored in the PDA it can be opened to review files.

RECONNECT AN ACTUATOR

If a link between the PDA and actuator has previously been established a list will appear and a search for new devices will not occur.

DISCOVER A NEW ACTUATOR

The PDA will search a radius of 10 meters for CVA actuators.

QUIT

Exit the menu.



Fig. 3.3

Installation & Setup Guide

Reconnect or discover an actuator

Searching for Actuator

The PDA will now search for any CVA actuators within Bluetooth range. If there is more than one device a list will be generated.

Highlight, then select the required actuator from the list of units within range.

The actuator will generally report its identity by its serial number (shown on nameplate). This can be modified to add an MOV or Tag reference. (See full PDA menu details)

If there are numerous Bluetooth devices in range the search process will take longer to complete and in some cases may have to be repeated.

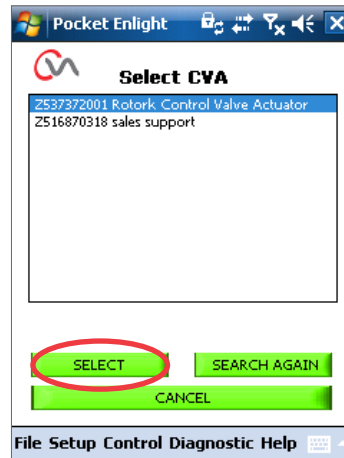


Fig. 4.1

Login procedure

Before the link can be established it is necessary to log in.

There are three levels of login with password protection to limit higher level access.

View

Allows review of actuator settings only. No changes can be made.

Password : **view**

User

Allows access to review and change actuator settings. Includes the facility to set limits of travel and take local control of the actuator.

Default Password : **sulis**

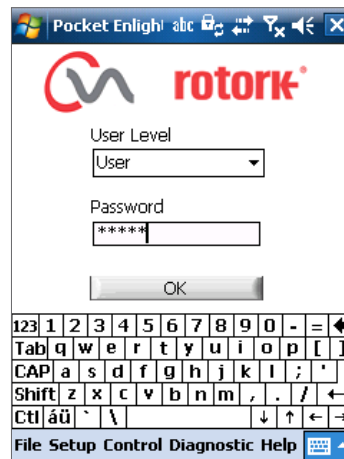


Fig. 4.2

This password can be changed using the 'Setup' menu to provide additional site security.

DO NOT LOSE THE PASSWORD INFORMATION

Rotork Engineer

Rotork use only.

Login

Select 'User' on the User Level drop down menu. Note, user is the default and will appear in the box.

Using the keyboard at the bottom of the screen, type in the password then click on 'OK' to start the procedure. If communication is successful you will be prompted to wait whilst the setup data is retrieved from the actuator.

If the incorrect password is entered an error message will be displayed. The actuator password cannot be reset. An error code will be generated, make a note of the code then please contact your local Rotork representative stating the full error code. The actuator's current password may then be verified and confirmed.



Fig. 4.3

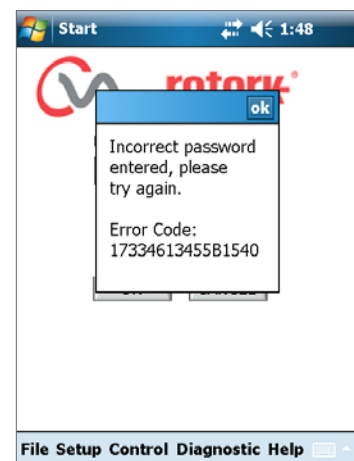


Fig. 4.4

Installation & Setup Guide

Stroke Setup Menu

There are three choices from this menu.

Align Coupling

If the actuator is not fully fitted to the valve this procedure must be carried out to enable correct assembly and alignment of the actuator coupling to the valve stem.

Quick Setup Wizard

Use this menu to automatically set actuator limits of travel.

Go to Page 10

Manual Setup

Use this menu to manually set actuator limits of travel.

See publication PUB042-003 for further details.

It is possible on this screen to choose Imperial or Metric units. The actuator serial number, current valve stroke and position are also displayed.

⚠ WARNING

The default setting of a new actuator is **minimum thrust and extend to close**. If the actuator has previously been commissioned it is essential that its basic settings are checked before fitting the coupling and operating the actuator electrically. Check the settings in the Manual Setup menu and adjust if necessary.

⚠ WARNING

When RUN mode is selected the actuator will respond to any active remote control commands.

Select 'STOP' on the Actuator Selector Knob to prevent any unwanted movement.

Fitting Actuator to Valve

Select the '**ALIGN COUPLING**' option.
Select Metric or Imperial Units as required.

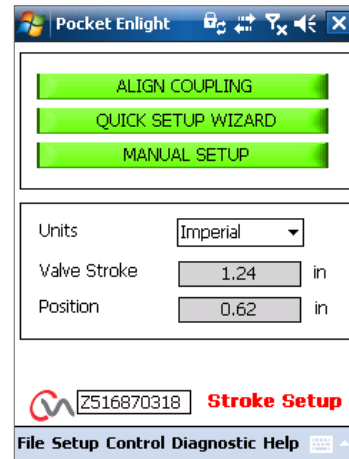


Fig. 5.1



Fig. 5.2

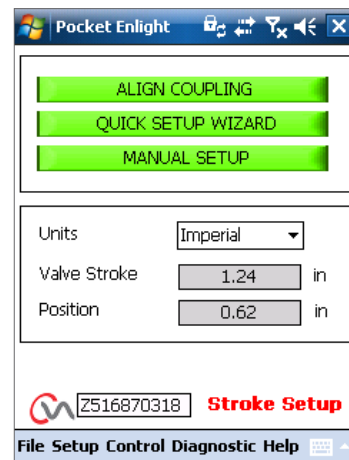


Fig. 5.3

Installation & Setup Guide

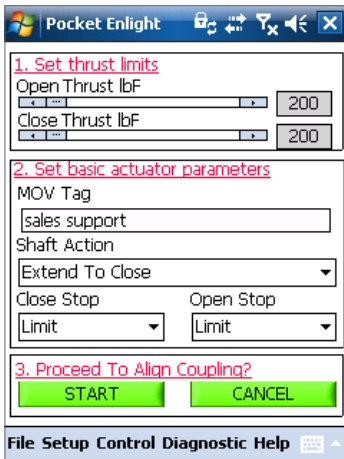


Fig. 6.1

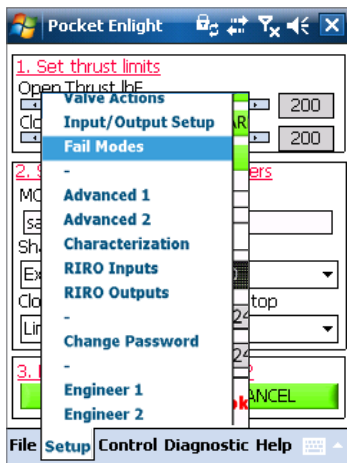


Fig. 6.2

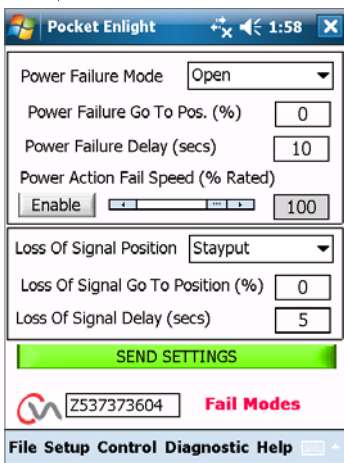


Fig. 6.3

1. Set thrust limits

The maximum amount of thrust available for the open and close direction of travel can be adjusted by dragging the slider from left to right.

2. Set basic actuator parameters

MOV Tag

The actuator can be given a TAG number for ease of identification in the field.

Shaft Action

Set open or closed direction to extend the output drive shaft.

Close/Open Stop

Thrust - Apply set thrust to the valve stem at end of travel limit where valve tight shutoff is required.

Limit - Stop the actuator at the set limit where valve does not require tight shutoff.

Select the **START** option to save changes and proceed to align the coupling.

Select basic parameters and thrust limit settings as required.

3. Proceed To Align Coupling

Click on the start box to commence fitting of the actuator to the valve.

⚠ WARNING

When RUN mode is selected the actuator will respond to any active remote control commands.

If no Analogue request is applied the actuator will carry out its loss of control signal fail to position function. If necessary go to the Fail Modes Menu and select the STAYPUT option and send the settings back to the actuator.

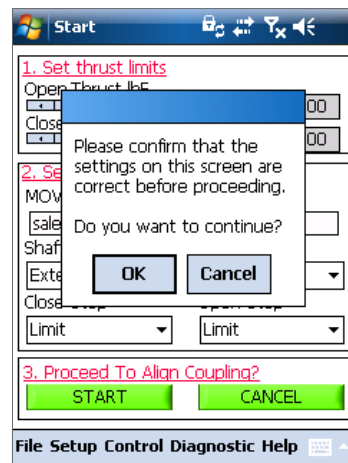


Fig. 6.4

Installation & Setup Guide

Align Coupling

It is now possible to operate the actuator using the Enlight program. Moving the position control slider will extend or retract the output shaft to enable it to be connected to the valve spindle. Coarse control will allow full travel of the actuator. Fine control is used for small adjustments of the actuator spindle.

Incrementing the position slider using the arrows will vary position by 1% for coarse and 0.1% for fine control.

When the position control is operated for the first time a warning will appear to indicate that the actuator will be taken offline and will not respond to remote control commands.

⚠ CAUTION

The actuator will move to the indicated position on the Position Control Slider.

Select OK

Click on the 'OK' button and the actuator will be taken offline and will now move to the position as indicated on the position control slider.

The actuator is now unavailable for remote control.

Connect the output shaft to valve spindle.

Using the position control slider move the output shaft to the full actuator output shaft travel limit or until it reaches the valve spindle leaving minimal gap and ensure there is no misalignment between the two shafts. If the actuator output shaft reaches its fully extended position it will be necessary to retract the shaft a sufficient distance to ensure a tight shut off in thrust seating valves.

⚠ WARNING

It is critical that there is correct alignment between actuator output shaft and the valve stem.

Note: Mis-alignment will result in increased mechanical wear and possible damage to the valve stem.

If the output shaft and valve stem are not aligned correctly then adjust the mounting position of the yoke and actuator as necessary.

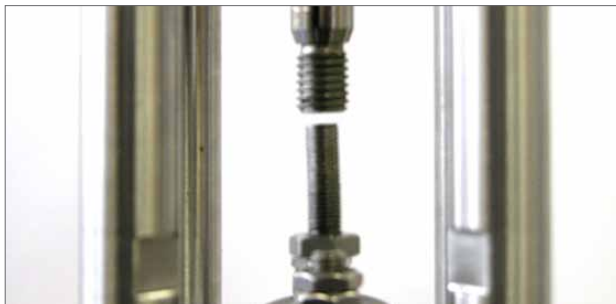


Fig. 7.4

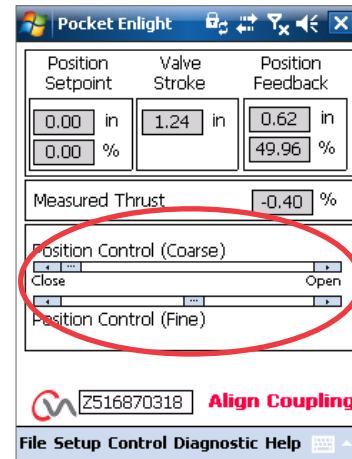


Fig. 7.1

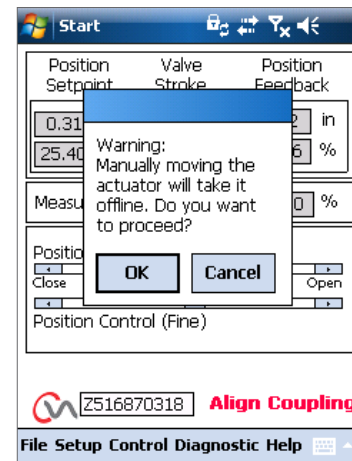


Fig. 7.2

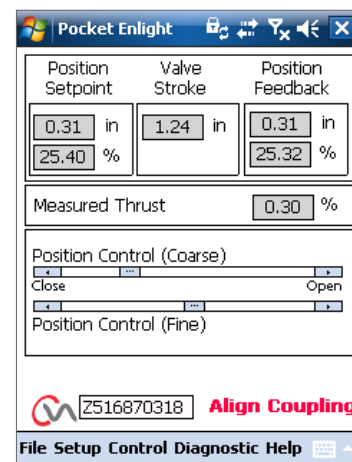
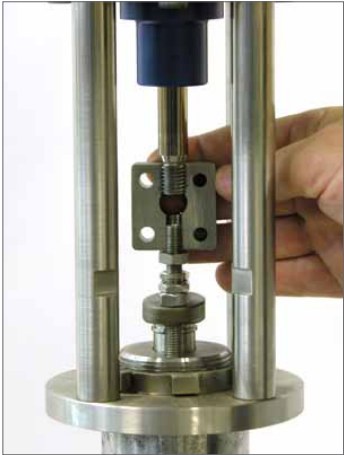


Fig. 7.3

Installation & Setup Guide

Connect the output shaft to the valve spindle using a suitable coupling.

It is now possible to set the end of travel limits.



Quick Setup Wizard

If the valve is to be commissioned over its full stroke the quick setup wizard is a fast and efficient way to set the end of travel limits. The quick set up wizard will allow the actuator to find the end of travel by measuring the output thrust. If the valve is not capable of accepting thrust in the open direction it is possible to set a fixed limit.

Select Quick Setup Wizard

Set thrust limits

The default thrust values for the Auto setup are automatically set to 40% of rated thrust in both directions. Adjust if more thrust is required to move the valve through stroke.

Set basic actuator parameters

The MOV tag can be edited. Use the keyboard to edit the MOV tag field.

Shaft Action

Select Extend or Retract output shaft to suit valve operation.

Close/Open Stop

Set the end of travel stop function for Thrust or Limit to suit the characteristics of the valve.

Thrust

The actuator can be set to apply its selected output 'Thrust' to the valve at the end of travel where tight shut off is required.

Limit

Alternatively it can be set to the 'Limit' function to disengage motor drive and stop the valve at a predetermined position where the valve does not require the seating force to be applied to the valve seat or end of mechanical valve travel.

Click on the 'START' box to save changes to the actuator and initiate the Auto Setup routine.

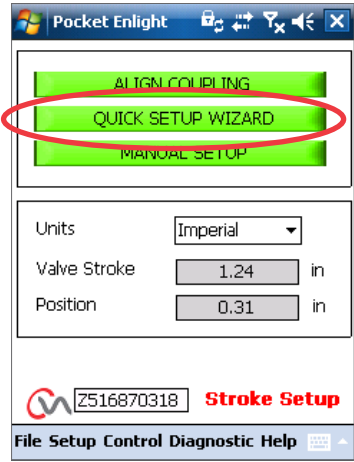


Fig.8.1

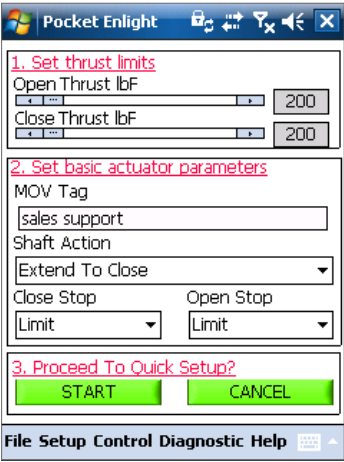


Fig. 8.2

Installation & Setup Guide

Move the selector Knob to the 'RUN' position



⚠ CAUTION

Initiating an Auto Setup will move the valve through its full stroke.

⚠ WARNING

Ensure thrust, shaft action and end stops are correctly set or damage to the valve may occur. If the valve is not capable of accepting thrust in the open direction use the fixed limit function.

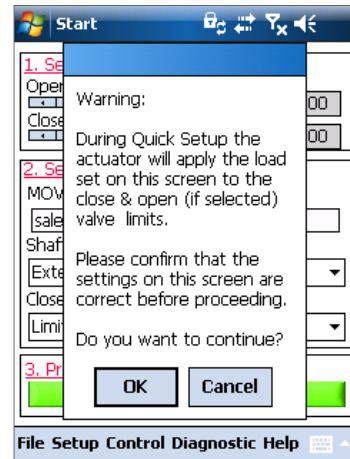


Fig. 9.1

AUTO LIMIT will initiate the auto setting procedure.

FIXED LIMIT will allow the actuator to find the closed limit by measuring the thrust but will allow the open limit to be set at a measured distance. The distance can be edited in the text box.

NOTE: Ensure that limit is selected for the open stop if fixed limit is applied.

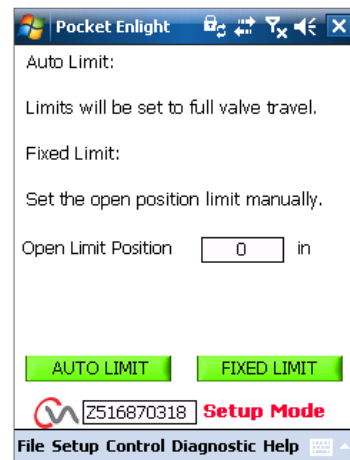


Fig. 9.2

Installation & Setup Guide

The Quick Setup is fully automatic and requires no user input

Start QuickSetup?

Click on the 'START' box to initiate the Quick setup procedure. Click on the OK box to continue. All other menus will be disabled until the process is completed.

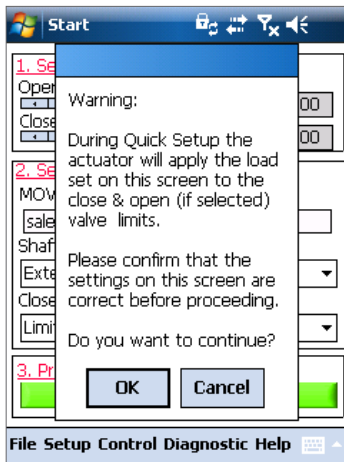


Fig. 10.1

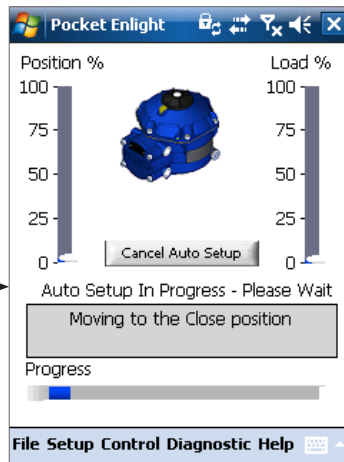


Fig. 10.2

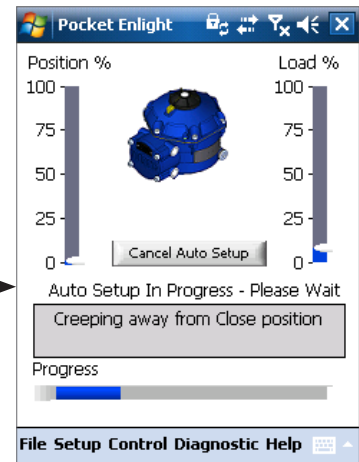


Fig. 10.3

Finding the Extended (Closed) Limit

The actuator will move its output shaft to the maximum CLOSED limit of travel.

Actuator will then move its output shaft away from the Closed limit of travel and repeat the procedure to eliminate any inertia effects and re-adjust the end of travel limit as necessary.

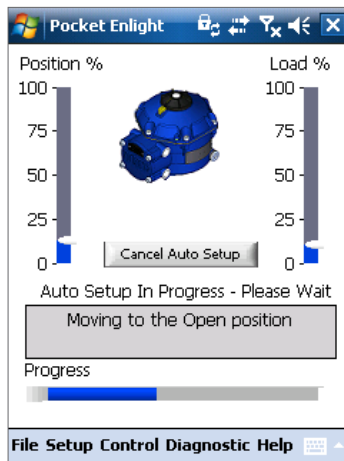


Fig. 10.4

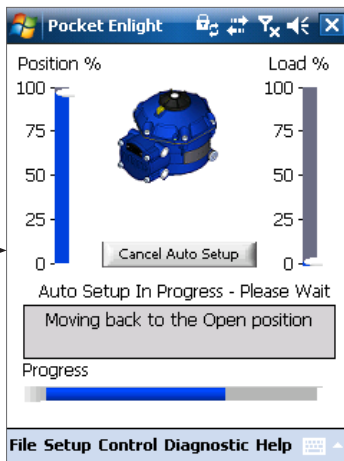


Fig. 10.5

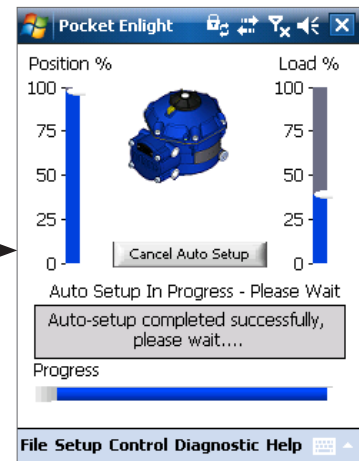


Fig. 10.6

Finding the Open Limit

The actuator will move its output shaft to the maximum OPEN limit of travel. Actuator will then move its output shaft away from the Open limit of travel and repeat the procedure to eliminate any inertia effects and re-adjust the end of travel limit as necessary.

The Open position limit is now set and Auto Setup is Complete.

Installation & Setup Guide

REFERENCE STROKE

On completion of the Quick setup action a prompt to record a new thrust reference stroke screen appears.

Select 'CANCEL' to finish Quick setup without recording a new thrust profile.

Select 'OK' to record a new Thrust Profile.

This function will clear the datalogger thrust profile logs. The actuator will carry out an Open and a Closed operation. A new thrust profile will be generated for the Open and Close directions and can be accessed on future downloads.

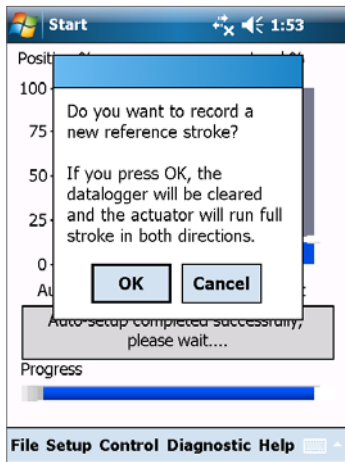


Fig. 11.1

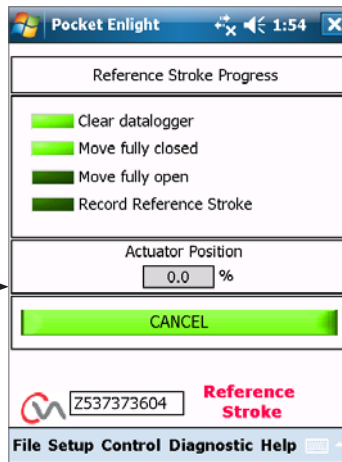


Fig. 11.2

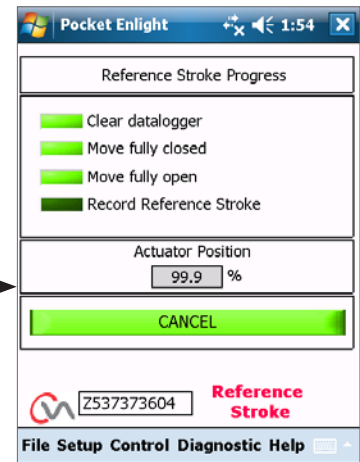


Fig. 11.3

ACTUATOR AUTOMATIC SETUP IS NOW COMPLETE

Auto setup is now complete and both ends of travel tight shut off limits have been defined and set.

PDA screen will return to the Stroke Set up menu.

If no further settings are required move the Mode selector to the 'STOP' or 'RUN' positions depending on desired Operation.

Exit the menu.

For further settings see publication PUB042-003.

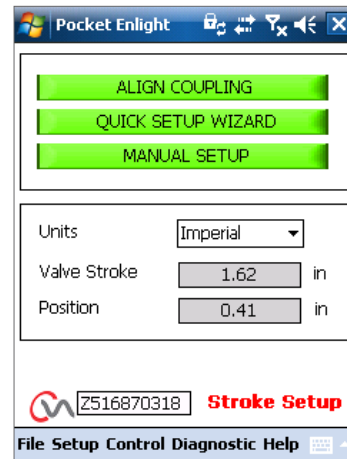


Fig. 11.4

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