Service Bulletin

Bulletin No. 2015-18

Circulate to: ☐ Sales Manager ☐ Accounting ☑ Service Manager ☑ Technician ☑ Parts Manager

OptiMax Fuel Rail Kits and Pressure Transducer Kit

Models Affected

Models Covered	Serial Number
All OptiMax Outboards	0G590000 and above

Scope

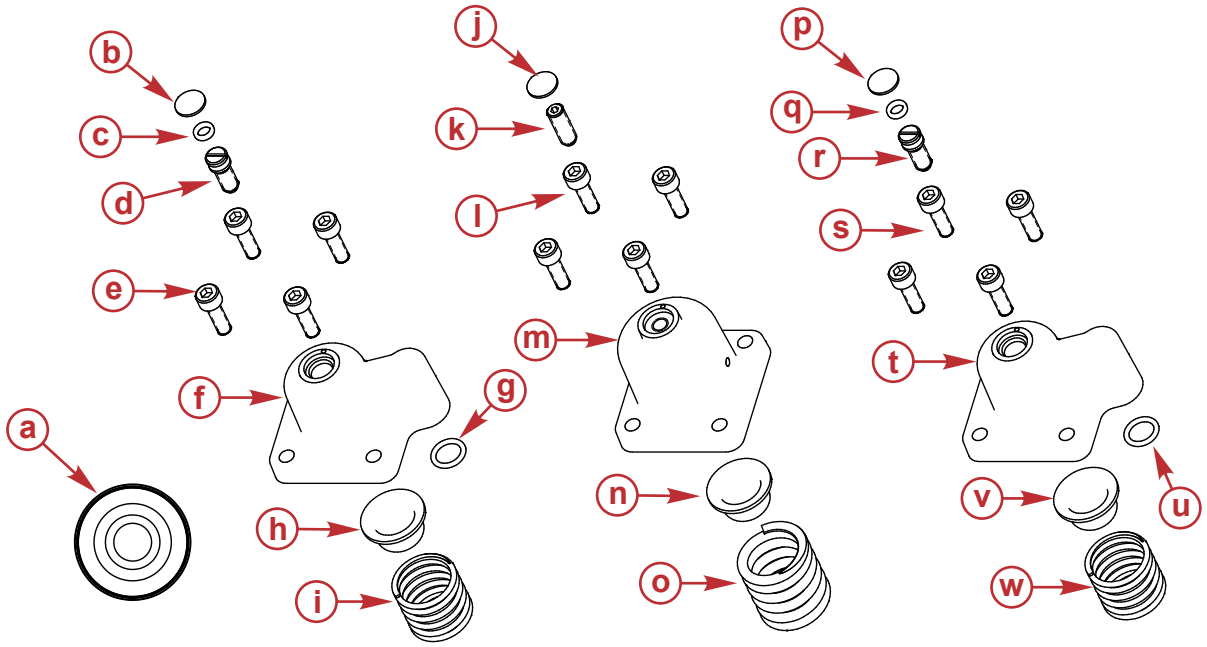
Worldwide

Situation

Parts, tools, and software are available for the maintenance and repair of the fuel rails on OptiMax outboard engines.

OptiMax Fuel/Air Kits

Components Contained in Kits



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Diaphragm Service Kit 8M6002988

Ref.	Qty.	Description	Part Number
a	1	Diaphragm	NSS

Fuel Regulator Service Kit 8M6002989

Ref.	Qty.	Description	Part Number
b	1	Expansion plug	NSS
c	1	O-ring	NSS
d	1	Fuel regulator adjusting screw	NSS
e	4	Stainless steel screw	NSS
f	1	Regulator cover	NSS
g	1	O-ring	NSS
h	1	Spring retainer	NSS
i	1	Spring, 14 psi delta	NSS

Air Regulator Service Kit 8M6002991

Ref.	Qty.	Description	Part Number
j	1	Expansion plug	NSS
k	1	Air regulator adjusting screw	NSS
l	4	Stainless steel screw	NSS
m	1	Regulator cover	NSS
n	1	Spring retainer	NSS
o	1	Spring	NSS

Fuel Regulator Service Kit 8M6002990

Ref.	Qty.	Description	Part Number
p	1	Expansion plug	NSS
q	1	O-ring	NSS
r	1	Fuel adjusting screw	NSS
s	4	Stainless steel screw	NSS
t	1	Regulator cover	NSS
u	1	O-ring	NSS
v	1	Spring retainer	NSS
w	1	Spring, 10 psi delta	NSS

Installation and Calibration

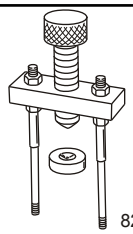
Required and Optional Tools

- A shop air supply system capable of supplying 689.5 kPa (100 psi)

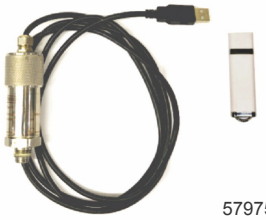
⚠ CAUTION

Using compressed air can cause serious injury. Always wear eye protection when working with compressed air to prevent injury from ruptured hoses or flying debris.

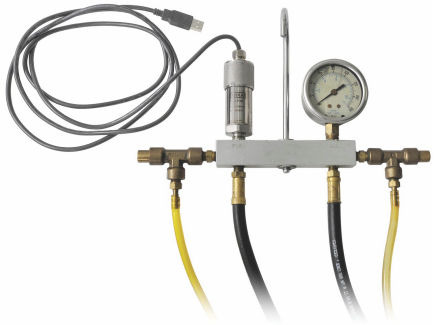
- The appropriate service manual for the outboard being serviced
- Air regulator installation tool

Air Regulator Installation Tool	91-889431
 8291	Compresses the air regulator spring to allow installation of assembly screws.

- A laptop computer
- A gearcase flush attachment, test tank, or a suitable body of water for in-the-water testing
- The pressure transducer kit, which accurately measures the regulator pressures using a software program on the USB drive.

Pressure Transducer Kit	8M0105244
 57975	Used in conjunction with the computer diagnostic system (CDS) to precisely measure fuel and air rail pressures.

- The dual fuel/air pressure gauge kit can be used to attach the pressure transducer in place of one of the pressure gauges.



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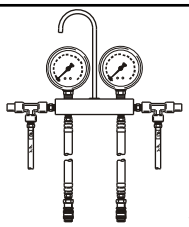
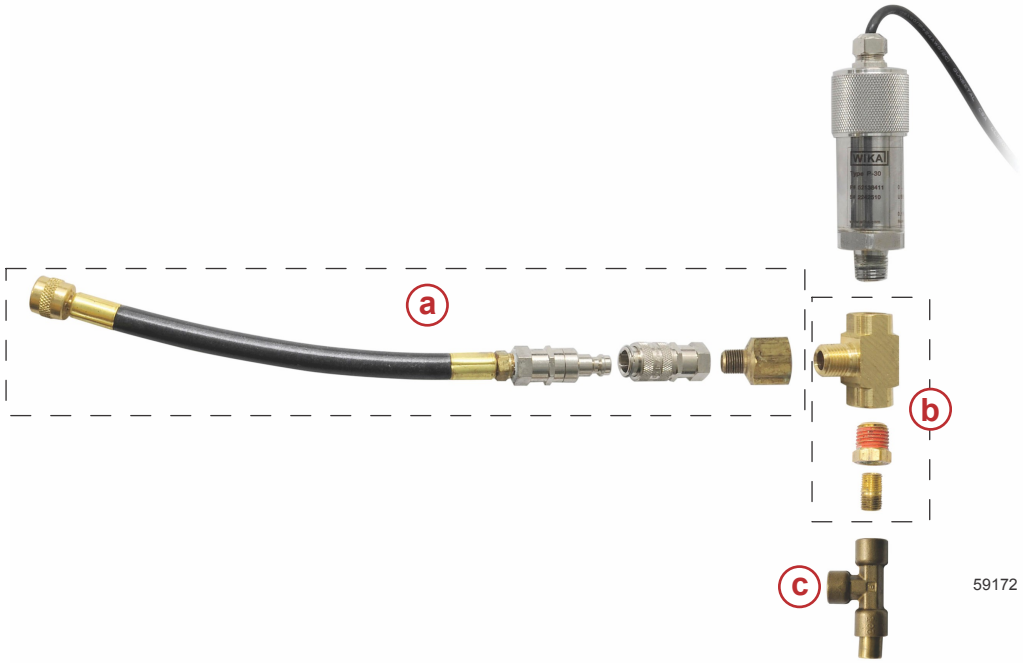
Dual Fuel/Air Pressure Gauge Kit	91-881834A 1
 5822	Tests fuel and air pressure; the dual gauges allow the viewing of both pressures simultaneously.

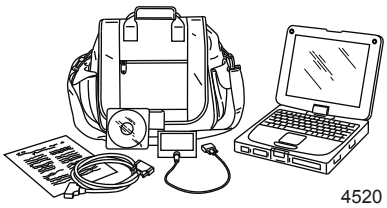
- An optional adapter kit, 91-803804A 2, used directly with the shop air can be utilized in place of the dual fuel/air pressure gauge kit.



a - Kit components
b - Fittings obtained locally
c - Purge valve, 804706

- An optional extension hose, 91-881835, is also available.

- The CDS G3 system, to activate and run the fuel pumps.

Computer Diagnostic System (CDS)	Purchase from Bosch Automotive Service Solutions
 4520	Monitors all electrical systems for proper function, diagnostics, and calibration purposes. For additional information, pricing, or to order the Computer Diagnostic System contact: USA and Canada Bosch Automotive Service Solutions 28635 Mound Rd. Warren, MI 48092 800-821-3036 oetech@servicesolutions.spx.com or EMEA 0049 6182 959 403 technical-support@spx.com Australia 61 3 9544 6222 techsupport-aus@servicesolutions.spx.com Mexico 52 55 25 95 16 30 (option 9) tecnico@spx.com Brazil 0800-762-1003 (option 9) tecnico@spx.com *CDS G3 must be purchased from Mercury Marine

IMPORTANT: The pressure transducer kit must be used to correctly calibrate and verify the fuel and air rail pressures to meet emissions regulations. Engine running issues or spark plug fouling issues will not be covered under warranty if this transducer is not used during the repair process.

OptiMax Fuel and Air Rail Pressure Regulator Setting Specifications

The following table shows the optimal air pressure reading, the acceptable tolerance, and the delta pressure specifications.

Direct Injector Color	Outboard Model	Air Pressure kPa (psi)	Air Tolerance ± kPa (psi)	Delta Pressure kPa (psi)
Gray	1.5L	657 kPa (95.3 psi)	7 kPa (1 psi)	97 kPa (14 psi)
Blue/Black	2.5L	557 kPa (80.8 psi)	7 kPa (1 psi)	72 kPa (10.4 psi)
Blue/Black	3.0L	573 kPa (83.1 psi)	7 kPa (1 psi)	73 kPa (10.6 psi)
Blue/Black	3.0L SJ	573 kPa (83.1 psi)	7 kPa (1 psi)	73 kPa (10.6 psi)
Gray	2.5L	650 kPa (94.3 psi)	13 kPa (1.9 psi)	97 kPa (14 psi)
Gray	3.0L	657 kPa (95.3 psi)	7 kPa (1 psi)	97 kPa (14 psi)

Diaphragm Replacement Only

IMPORTANT: Refer to the following instructions when only the diaphragms require replacement, and no other parts were replaced or adjusted.

IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

1. Refer to the appropriate outboard service manual to replace the damaged diaphragm and install the fuel/air rails.
2. Install the software on a laptop and download the instruction manual PDF from the USB drive. Refer to **Software Installation**.
3. Connect the pressure transducer to a laptop computer.
   a. If the air regulator diaphragm was replaced, remove the transducer fitting from the air side Schrader valve and install it onto the fuel side Schrader valve to measure the fuel pressure. Record the pressure reading.

b. If the fuel regulator diaphragm was replaced, remove the transducer fitting from the fuel side Schrader valve and install it onto the air side Schrader valve to measure the air pressure. Record the pressure reading.
IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa ± 3.44 kPa (10.5 psi ± 0.5 psi) for engines with blue or black air injector systems, or 97.2 kPa ± 3.44 kPa (14.1 psi ± 0.5 psi) for engines with gray air injector systems.
IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

IMPORTANT: Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

4. Connect the pressure transducer to the air or fuel side Schrader valve (depending on which diaphragm was replaced).
5. Provide the engine with cooling water for a running test using a gearcase flush attachment, test tank, or lake.
6. Start the engine and allow it to reach operating temperature.
7. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM ± 100 RPM.
8. Check the pressure reading on the computer screen. Record the pressure reading.
9. Adjust the regulator adjusting screw as needed to meet the specifications for the engine being worked on. If the screw is set in place with Loctite and cannot be adjusted, replace the regulator cover, spring, and spring retaining cup. Refer to **Regulator and Diaphragm Replacement** and the appropriate outboard service manual.
   a. If the fuel regulator diaphragm was replaced, remove the transducer fitting from the fuel side Schrader valve and install it onto the air side Schrader valve to measure the air pressure. Record the pressure reading.
   IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa ± 3.44 kPa (10.5 psi ± 0.5 psi) for engines with blue or black air injector systems, or 97.2 kPa ± 3.44 kPa (14.1 psi ± 0.5 psi) for engines with gray air injector systems.
   IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

IMPORTANT: Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

   b. If the fuel or air delta pressures do not meet specification, refer to **Regulator and Diaphragm Replacement**.
10. Return the engine to idle speed, then stop the engine.
11. Remove the pressure transducer fitting from the fuel or air side Schrader valve.
12. Disconnect the transducer from the computer.
13. Start the engine and verify the engine running quality.

Regulator and Diaphragm Replacement

IMPORTANT: Refer to the following instructions if the regulator cover, spring, retainer, and diaphragms require replacement or adjustment.
IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

NOTE: *Use a 2.5 mm hex Allen wrench to adjust the air pressure regulator screw, and a flat blade screwdriver to adjust the fuel pressure regulator screw. Clockwise rotation of the adjusting screws increases the fuel or air pressure.*

1. Remove the engine air compressor inlet line from the fuel rail on V6 OptiMax engines. For 3-cylinder OptiMax engines, remove the plug on the top of the fuel rail (do not discard) and insert an air compressor inlet rail fitting.
2. Using the shop air regulator, regulate the shop air pressure to the rail using a laptop and the pressure transducer. The transducer should be located 25.4–40.6 cm (10–16 in.) from the engine air compressor inlet on the fuel rail.

3. Adjust the shop air supplied to the rail to 689.5–758.4 kPa (100–110 psi).
4. Connect the pressure transducer to the air side Schrader valve on the fuel rail.
5. Connect the shop air to the engine air compressor inlet fitting on the fuel rail.

   NOTE: *Shop air must be regulated to obtain the correct bypass air flow. You may hear a humming sound in the fuel/air rail system when the regulator on the fuel/air rail is open and bypassing excess air.*
6. If air pressure regulator adjustment is required, use a 2.5 mm hex Allen wrench to adjust the air pressure to the specified pressure. Clockwise rotation will increase pressure, counterclockwise will decrease pressure.
   IMPORTANT: Do not turn the regulator screw out too far.

   NOTE: *If the air pressure supply from the shop compressor drops below the regulated pressure, or if the shop compressor cycles, stop the adjustment process until the shop air stabilizes.*
7. Record the air pressure reading. Compare the reading to the **OptiMax Fuel and Air Rail Pressure Regulator Setting Specifications** chart.
8. Remove the transducer fitting from the air side Schrader valve.
9. If only adjusting the air regulator, skip ahead to step 17.
10. For fuel pressure adjustment, leave the shop air pressure connected to the air side to obtain the correct air flow through the air regulator.
11. Install the transducer fitting onto the fuel side Schrader valve to measure the fuel pressure.
12. Ensure that there is fuel in the fuel system. Run the fuel pumps using the CDS.
13. Use a flat blade screwdriver to adjust the fuel pressure to the correct delta pressure specification, using the previously recorded air pressure measurement as a reference.
    IMPORTANT: Do not turn the adjustment screw out too far.

⚠ WARNING

Avoid serious injury or death from high-pressure injection injuries caused by fluids under pressure. Fluids under pressure can penetrate the skin, resulting in excruciating pain, possible loss of limb, or death.

To avoid the possibility of high-pressure injection injuries:

- **Always keep body parts away from escaping high-pressure fluids and components capable of generating high-pressure spray.**
- **Never check for fluid leaks with your hands.**
- **Always wear appropriate personal protective equipment when working with fluids under pressure.**
- **Always ensure that all fittings are tight before applying pressure to fluid systems.**
- **Always relieve system pressure before removing fittings or fluid lines.**

IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa ± 3.44 kPa (10.5 psi ± 0.5 psi) for engines with blue or black air injector systems, or 97.2 kPa ± 3.44 kPa (14.1 psi ± 0.5 psi) for engines with gray air injector systems.
IMPORTANT: Refer to the appropriate outboard service manual for the pressure specifications of the outboard being serviced.

NOTE: *If the air pressure supply from the shop compressor drops below the regulated pressure, or if the shop compressor cycles, stop the adjustment process until the shop air stabilizes.*

IMPORTANT: Do not run the fuel pumps for more than one minute, as the fuel system may overheat without the engine running. If necessary to restart the fuel pumps, allow the fuel to cool for 2–3 minutes before restarting the fuel pumps.

14. Stop the fuel pumps.
15. Remove the air supply from the fuel/air rail.

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

IMPORTANT: Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

16. Disconnect the transducer fitting from the fuel side Schrader valve.
17. Install the engine air compressor inlet line onto the fuel rail (on V6 OptiMax engines). For 3-cylinder OptiMax engines, remove the air compressor inlet rail fitting and install the plug into the top of the fuel rail.
18. Install the transducer fitting onto the air side Schrader valve.
19. Provide the engine with cooling water for a running test using a gearcase flush attachment, test tank, or lake.
20. Start the engine and allow it to reach operating temperature.
21. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM ± 100 RPM.
22. Compare the air pressure measurement to the fuel pressure measurement.
    IMPORTANT: The resulting delta pressure (pressure difference) should be 72.4 kPa ± 3.44 kPa (10.5 psi ± 0.5 psi) for engines with blue or black air injector systems, or 97.2 kPa ± 3.44 kPa (14.1 psi ± 0.5 psi) for engines with gray air injector systems.
23. If the air pressure is not correct, repeat steps 1–12 in **Diaphragm Replacement Only**.
24. Install the transducer fitting onto the fuel side Schrader valve to measure the fuel pressure.
25. Start the engine and allow it to reach operating temperature.
26. With the engine in neutral, advance the throttle until the engine reaches 1000 RPM ± 100 RPM.
27. Check the fuel pressure.
28. If the fuel pressure is not correct, repeat step 8 in **Diaphragm Replacement Only**.

⚠ CAUTION

Failure to release pressure from the fuel system will result in fuel spraying out, which can cause a fire or explosion. Allow the engine to cool completely and release all fuel pressure before servicing any part of the fuel system. Always protect eyes and skin from pressurized fuel and vapors.

IMPORTANT: Bleed the fuel pressure off in a safe manner before disconnecting the transducer fitting from the fuel side Schrader valve. Collect any excess fuel in an environmentally friendly manner.

29. Disconnect the transducer fitting from the fuel side Schrader valve.
30. Disconnect the transducer from the computer.
31. Start the engine and verify the engine running quality.
32. Apply Loctite 290 to the top of the regulator adjusting screws in the regulator covers.

Tube Ref No.	Description	Where Used	Part No.
	Loctite 290	Top of the screws in the regulator covers	Obtain Locally

33. Install expansion plugs in the top of the regulator covers.

System Requirements

The software requires a 32-bit operating system with one of the following: Microsoft® Windows® 2000, Microsoft® Windows® XP, Microsoft® Windows® Vista, or Microsoft® Windows® 7.

Pressure Transducer Kit

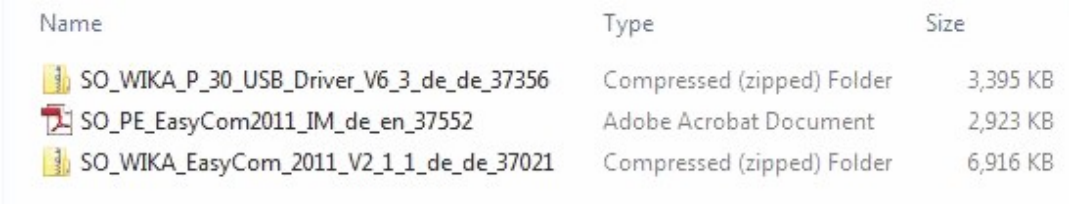
57916

Key	Description	Part Number
a	Pressure transducer	NSS
b	Flash drive with software and drivers	NSS

Software Installation

The flash drive contains files for installing and using the pressure transducer. This includes an Adobe Acrobat® .pdf file that includes operating instructions, as well as license information.

1. Before installing the software, close all open programs.
2. Open Windows Explorer, navigate to your choice of desktop, documents folder, or C: drive, and create a new folder called **Mercury_WIKA**.
3. Install the flash drive into an open USB port on your Windows computer. Windows may inform you that it is loading drivers for your new device (the flash drive).
4. When the flash drive is ready, either the file folder will open, or you will need to open Windows Explorer and navigate to the flash drive. You should see the following files on the flash drive:



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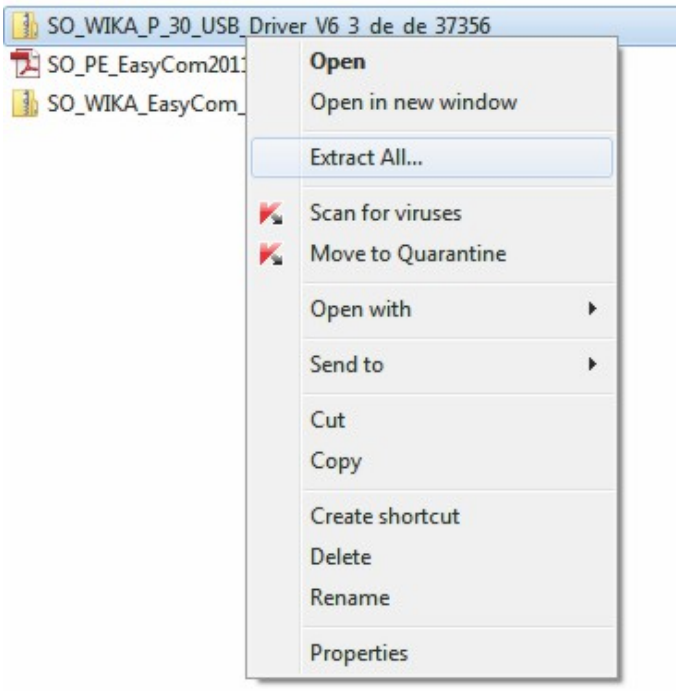
Flash drive contents

File Descriptions

File Name	Description
SO_PE_EasyCom2011_IM_de_en_37552	Operator's manual for software
SO_WIKA_P_30_USB_Driver_V6_3_de_de_37356	Compressed file in Zip format containing transducer drivers
SO_WIKA_EasyCom_2011_V2_1_1_de_de_37021	Compressed file in Zip format containing software

5. Extract the program files and drivers:

a. Right click on the file named **SO_WIKA_P_30_USB_Driver_V6_3_de_de_37356**. This is a compressed (zipped) file containing the drivers for the transducer. A menu should appear with several options, including **Extract All...**



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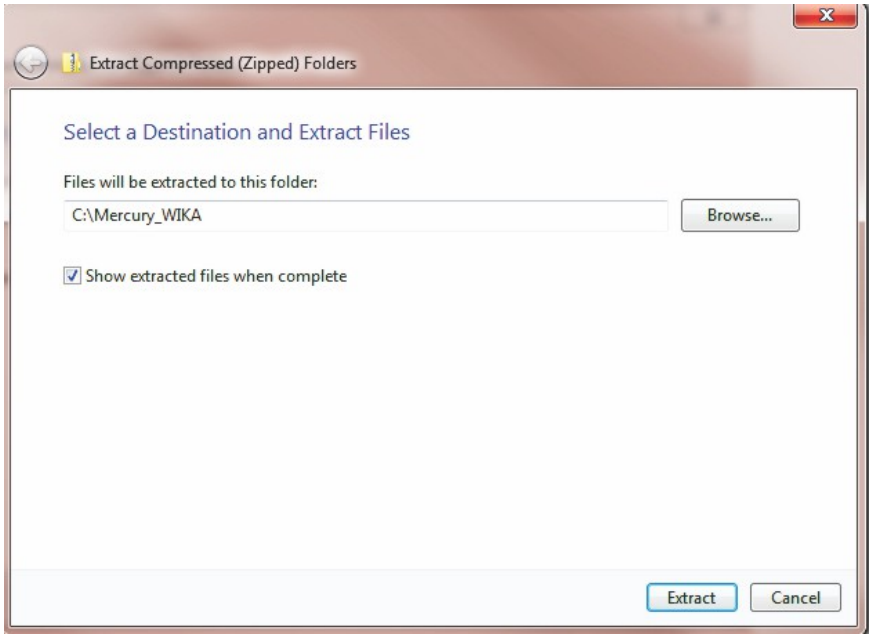
Right clicking on the file will bring up the option to Extract All...

b. Once the **Extract All...** option is selected, a dialog box will open asking you to select a destination for the files. Using the Browse button, navigate to the **Mercury_WIKA** folder created in Step 2, and select the **Extract** button.



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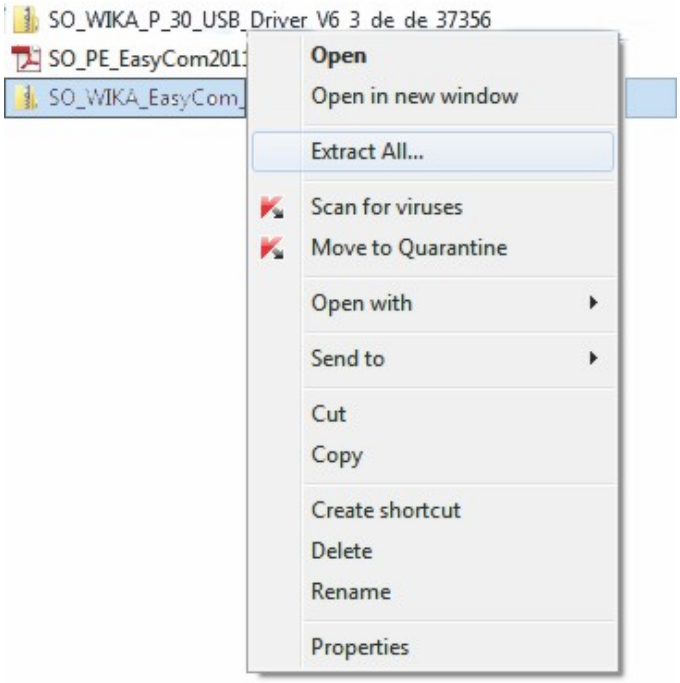
c. Return to the flash drive directory.

d. Right click on the file named **SO_WIKA_EasyCom_2011_V2_1_1_de_de_37021**. This is a compressed (zipped) file containing the software for the transducer. A menu should appear with several options, including **Extract All...**



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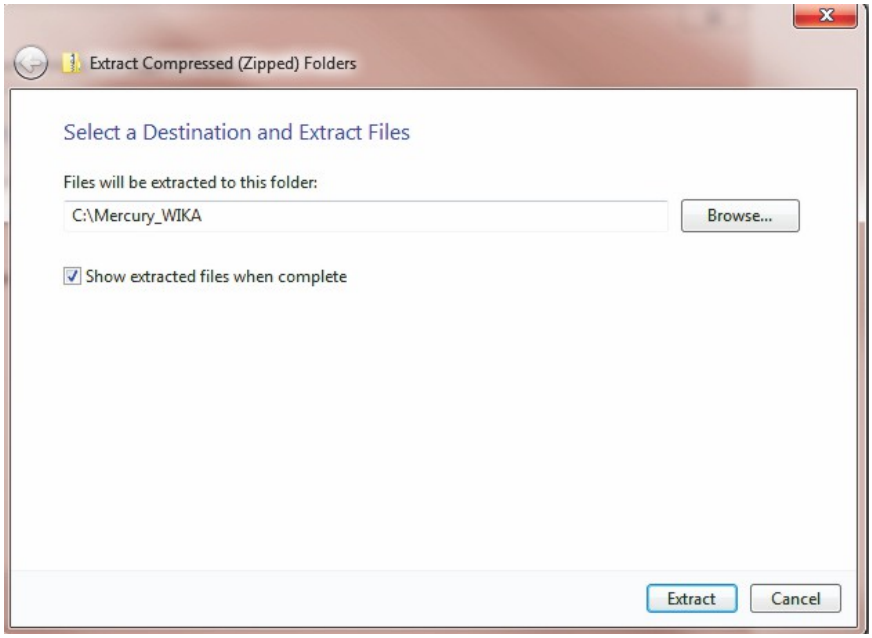
Right clicking on the file will bring up the option to Extract All...

e. Once the **Extract All...** option is selected, a dialog box will open asking you to select a destination for the files. Navigate to the **Mercury_WIKA** folder created in Step 2, and select the **Extract** button.



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6. Remove the flash drive as you normally would, typically by right clicking on its icon or drive listing in Windows Explorer and selecting **Eject**. Once Windows notifies you that it is safe to do so, remove the flash drive from the USB port.
7. Using Windows Explorer, navigate to the **Mercury_WIKA** folder on your hard drive. The folder should now contain:
   a. A subfolder titled **P-30-USB**. This is the driver directory.
   b. An application titled **Setup EasyCom 2011 V2.1.1**. This is the software for the transducer.
   c. An Adobe Acrobat file titled **SO_PE_EasyCom2011_IM_de_en**. This is the operator's manual for the software.
8. Navigate to the **P-30-USB** folder by double clicking on it.
9. Within that folder is a file called **CP210xVCPInstaller**. Double click on this file and follow the on-screen instructions to install the driver files onto your computer.
10. When the drivers have been installed, return to the **Mercury_WIKA** folder and double click on the **Setup EasyCom 2011 V2.1.1** file. This will launch the software setup. Follow the on-screen instructions to review the license agreement, select operation language, and create program icons.

Starting the Program

Plug the transducer cable's USB end into an open USB port on your computer.

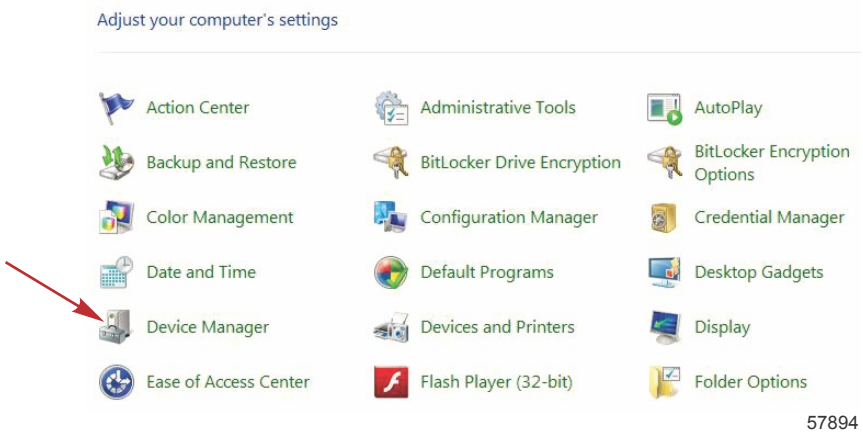
After the program is installed, it will provide the opportunity to start the program. Either select **Yes** on that screen or find the **EasyCom** icon, and start the program.

Depending on the options you chose when installing it, the program may be listed as EasyCom 2011 on your desktop, or in the subfolder WIKA in the Window start menu.

Selecting the COM Port

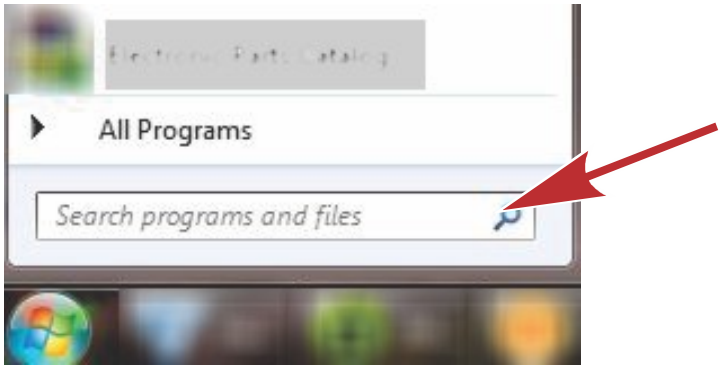
To run the program it will be necessary to identify the COM port the transducer is using.

1. Open **Device Manager**. In Windows this can be done by either:
   - Navigating to Windows Control Panel under the Start menu and selecting **Device Manager**,



Device manager may be found in the control panel

- Or by entering **Device Manager** into the search box at the bottom of Windows **Start** menu.



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Search box at bottom of Windows start menu

2. Once the Device Manager is open, expand the **Ports (COM & LPT)** submenu, and look for the listing for **Silicon Labs CP210x USB to UART Bridge (COMX)**, where the **X** following **COM** is the number of the COM port being used by the device. This number will be entered in the **WIKA EasyCom 2011** program.

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a - The **Ports** submenu of the **Device Manager**

b - Listing for the pressure transducer and its COM port

For information on using and calibrating the program, open the operator's manual file **SO_PE_EasyCom2011_IM_de_en.pdf** in the Mercury_WIKA folder. Section 2 of that file contains instructions for installing the program from a CD.