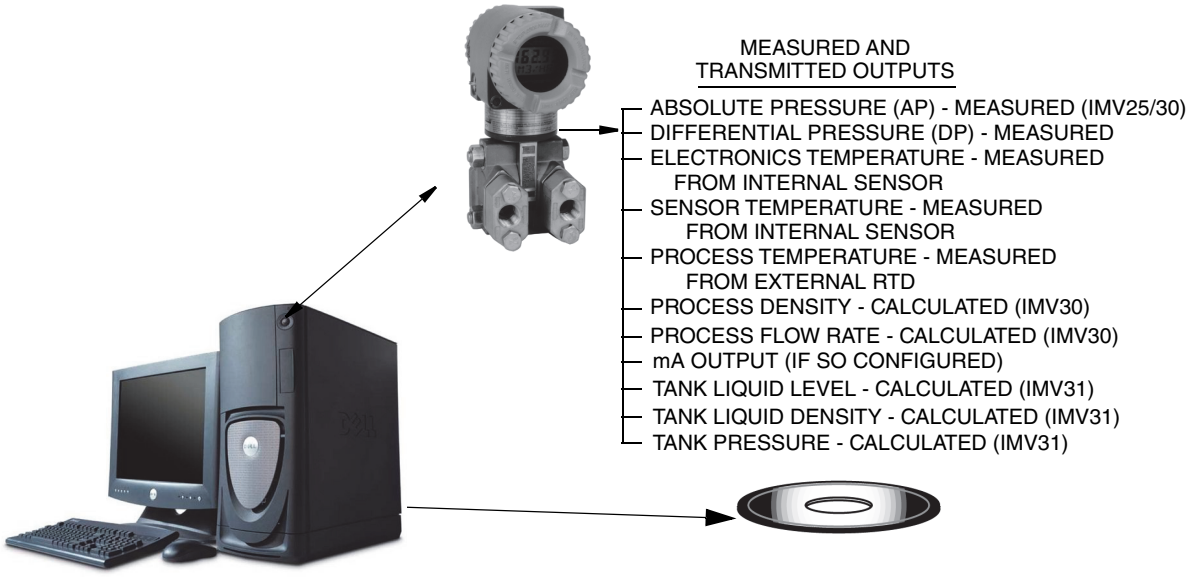
Model PCMV Configurator for Use with the I/A Series® Multivariable Transmitters Foxboro® Models IMV25, IMV30, and IMV31



PC-BASED CONFIGURATOR

MODEL PCMV CONFIGURATOR SOFTWARE ON CD-ROM

The Schneider Electric PCMV Configurator is a Windows-based software package for use with Foxboro Models IMV25, IMV30, and IMV31 Multivariable Transmitters. It displays measurements and has full calibration and configuration capability. It also utilizes a fluid properties table and primary device parameters to calculate flow rate and process density with the IMV30, and calculate tank liquid level, density, and pressure with the IMV31. A modem for use with either HART or FoxCom ™ protocols, as applicable, is required for communication with the transmitter.

FEATURES

- HART or FoxCom communication protocols;
  - HART: IMV25, IMV30, and IMV31.
  - FoxCom: IMV25 and IMV30.
- Provides all configuration and calibration functions, including upload and download of database parameters.
- Displays measurements of:
  - Absolute and differential pressures (AP and DP).
  - Sensor/electronics/process temperatures.
  - Process density for the IMV30.
  - Mass and volume flow rate in EGU at flowing/standard conditions for the IMV30.
  - Tank liquid level, density, and pressure measurements for the IMV31.

Equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Schneider Electric for any consequences arising from the use of this material.

- For use with the IMV30 and IMV31; it
  - Includes extensive fluid properties data table of over 275 liquids, gases, and vapors.
  - Supports multiple industry recognized flow and level equations for liquid, gas, and vapors, as applicable.
  - Provides numerous menu-driven primary device, flow standard, and parameter screens for selection and configuration.
  - Contains equations to simulate and test the density, flow rate, and level calculations of the IMV30 transmitter and IMV31, as applicable.

GENERAL DESCRIPTION

The Model PCMV Configurator is a software package providing remote bidirectional communication with Foxboro Models IMV25, IMV30, and IMV31 Multivariable Transmitters with HART or FoxCom communication protocols, as applicable. The Configurator reads a file of current transmitter configuration and calibration information, and allows user input of specific data unique to a new desired application. Features of the configurator include:

- Capability to read all measurements
- Ability to set up the transmitter for any pertinent application
- Capability to configure flow rate data for the IMV30, and level data for the IMV31
- Test modes to read predicted flow rate and process density for the IMV30, and tank liquid level and density for the IMV31
- Accurate reranging without recalibration
- Full screen device database display
- Enhanced device diagnostic capability
- Communication that does not affect output when reading measurements
- User-configurable measurement data graphical trend display
- Capability to reconfigure, copy, and clone databases
- Capability to upload, download, and print out device databases
- Unlimited device database storage on diskette or hard disk

The software package utilizes an external modem that allows operation with a Windows-compatible PC with a serial communication port. Communication with the transmitter uses proven frequency shift keying (FSK) techniques that do not affect the device output signal.

MINIMUM SYSTEM REQUIREMENTS

- 400 MHz Pentium with 512 MB RAM
- CD-ROM drive
- Microsoft Mouse or compatible pointing device
- Windows XP (SP2) or Windows 2000 Professional (SP4)
- 20 MB of available hard disk space
- Internet Explorer 6.0 or greater

MEASUREMENTS

Once the configurator is connected to the transmitter, the user can display the Scan Data Screen. Table 1 lists the measurements that can be displayed when the PCMV is used with an IMV25, IMV30, or IMV31 Multivariable Transmitter.

Table 1.
Measurements with IMV25, IMV30, and IMV31

Measurement	Desig-nation	With IMV25 (a)	With IMV30 (b)	With IMV31 (c)
mA Output	M0	Yes	Yes	Yes
Differential Pressure	M1	Yes	Yes	Yes
Absolute Pressure	M2 (d)	Yes	Yes	Yes
Sensor Temperature	M3	Yes	Yes	Yes
Electronics Temperature	M4	Yes	Yes	Yes
Process Temperature (External RTD)	M5	Yes	Yes	Yes
Flow Rate (Calculated)	M6	No	Yes	No
Process Density (Calculated)	M7	No	Yes	Yes
Liquid Level (Calculated)	M6	No	No	Yes
Height from Pressure Tap to Zero Level Point (Configurable)	H1	No	No	Yes
Height from Transmitter Connection to Pressure Tap (Configurable)	H2	No	No	Yes
Leg Height from Transmitter Connection to Tap Pressure Connection (Configurable)	H3	No	No	Yes

a. The Model PCMV is used with the FoxCom and HART versions of the IMV25. See PSS 2A-1C15 B transmitter specifications.

b. The Model PCMV is used with the FoxCom version of the IMV30. See PSS 2A-1C15 A transmitter specifications.

c. The Model PCMV is used with the HART version of the IMT31. See PSS 2A-1C15 C transmitter specifications.

d. M2 is tank pressure with the IMV31.

CONFIGURABLE PARAMETERS

Table 2 lists the configurable parameters when the Model PCMV is used with the IMV25 , IMV30, and IMV31 transmitters.

Table 2.
IMV25, IMV30, and IMV31
Configurable Parameters

Parameter (a)	Configuration
Mode	4 to 20 mA or digital
Descriptors	Tag data and other general device and site data
I/A Series System Display	Primary, secondary, tertiary, or fourth (HART only) measurement/calculation
mA Measurement	Forward or reverse direction and failsafe
Differential Pressure (DP)	Linear or square root, EGU for linear, % for square root, LRV, URV, and damping
Absolute Pressure (AP)	Display AP or GP, EGU, LRV, URV, and damping
External Temperature (RTD)	On or off, units, LRV and URV
Flow (with IMV30 only)	On or off, units, LRV, URV, and flow cutoff
Process Density (with IMV30 and IMV31 only)	Units, LRV and URV
Tank Liquid Level (with IMV31 only)	Units, LRV, and URV
Tank Pressure (with IMV31 only)	Units, LRV, and URV
Enable Passwords	No password, configuration only locked, or calibration and configuration locked
Reset Database	Keep or clear

a. Refer to applicable transmitter MI for details relating to HART or FoxCom configuration with the Model PCMV.

PROCESS FLUIDS SUPPORTED

A physical properties database includes detailed information to support the selection from a list of over 275 fluids, including many common liquids, gases, and vapors. Both superheated steam and saturated steam are supported, as is natural gas. The ability to enter density/temperature data is also provided when configuring for fluids not listed in the database.

IMV25 TRANSMITTER CONFIGURATION WITH MODEL PCMV

The IMV25 provides measurement of DP, AP, and process temperature for configuration. Also see Table 2. Sensor and electronics temperature are also measured. The configurable measurements may be transmitted to a measurement integration workstation (host computer) for a variety of applications, including flow rate and liquid level calculations. For direct calculation of flow rate, the Model IMV30 is recommended; and for direct calculation of tank level, the Model IMV31 is recommended. See sections that follow.

IMV30 TRANSMITTER CONFIGURATION WITH MODEL PCMV

The IMV30 provides measurement of DP, AP, and process temperature for configuration, and directly calculates flow and density. In addition to the configurable parameters, the PCMV provides for a selection of flow rate equations and primary flow devices.

The user can select the units of measure, the industry standard equation, the fluid and fluid state, the type of primary flow element, the material of primary element and adjacent piping, and the normal pressure and temperature conditions.

The output of the configurator is a data set including coefficients, which the PCMV Configurator can save and download to an IMV30 Multivariable Transmitter for the accurate determination of flow rate.

The PCMV configurator also provides full configuration capability to upload and download all configuration parameters used by the IMV30 Multivariable Transmitter.

Density and flow equations are based on Miller's *Flow Measurement Engineering Handbook*(1). Refer to the sections that follow for a list of flow rate equations and primary flow devices supported by the Model PCMV Configurator.

IMV31 TRANSMITTER CONFIGURATION WITH MODEL PCMV

The IMV31 provides measurement of DP, AP (Tank Pressure), and process temperature for configuration, and directly calculates tank liquid level and tank liquid density. It compensates for density variations caused by both pressure and temperature changes, thereby providing accurate DP-based level measurement even when liquid density varies. PCMV provides for a selection of level equations for either open or closed tanks, and for dry or wet leg applications.

The PCMV configurator allows the user to configure tank parameters such as height values, units of measure, and fluid data. It also determines a set of application-specific coefficients to be downloaded to the transmitter for use in the transmitter's equations for calculation of liquid level and density.

Refer to the sections that follow for a list of tank liquid level equations supported by the PCMV configurator.

IMV30 Flow Rate Equations(2)

The following industry standards may be selected:

- ISO-5167
- ANSI-2530, AGA-3, API-Ch.14
- ASME 3M
- ANSI 2530, AGA-3, Fluid Meters, and Spink [ANSI/API 2530 (to 1995), AGA-3 (1935-1995), Spink (1935 to date)]

1. Density and flow equations used for the calculated outputs, and flow terminology are from *Flow Measurement Engineering Handbook*, by R. W. Miller, available by specifying part number B0150YW.
2. ISO = International Standards Organization; ANSI = American National Standards Institute; ASME = American Society of Mechanical Engineers; API = American Petroleum Institute; AGA = American Gas Association.

IMV30 Primary Flow Devices Supported

- Orifice Plates
  - Concentric with Flange Taps, Corner Taps, D and D/2 Taps, Foxboro Model IFOA[3] with Square Edge or Quadrant Edge, Honed Orifice Run with Flange or Corner Taps, Quadrant Orifice, or Conic Orifice
  - Segmental with Flange Tap at Top, or Vena Contracta Tap at Top
  - Eccentric with Flange Tap at Top, Flange Tap at Side, Vena Contracta Tap at Top, and Vena Contracta Tap at Side
- Flow Nozzle
  - ASME Long Radius (with or without Diffuser)
  - ASME Throat Tap (with or without Diffuser)
  - ISO (ISA) (1934)
  - Venturi-Nozzle (ISA Inlet-Diffuser Exit)
- Venturi Meter
  - Machined, Cast, or Welded Sheet Inlets
  - 7 or 15 Degree Exit Cones
- Fixed Geometry
  - Compact Orifice
  - Multiport Averaging Pitot (MAP)
  - Veris Verobar
  - Veris Accelabar
- V-Cone (Mfd. by McCrometer)

3. IFOA = Integral Flow Orifice Assembly.

DEVICE AND PARAMETER SELECTION SCREENS

Refer to Figures 1 through 5 for typical screens.

Figure 1. Typical Device Configuration Screen for Differential Pressure (IMV25 shown)

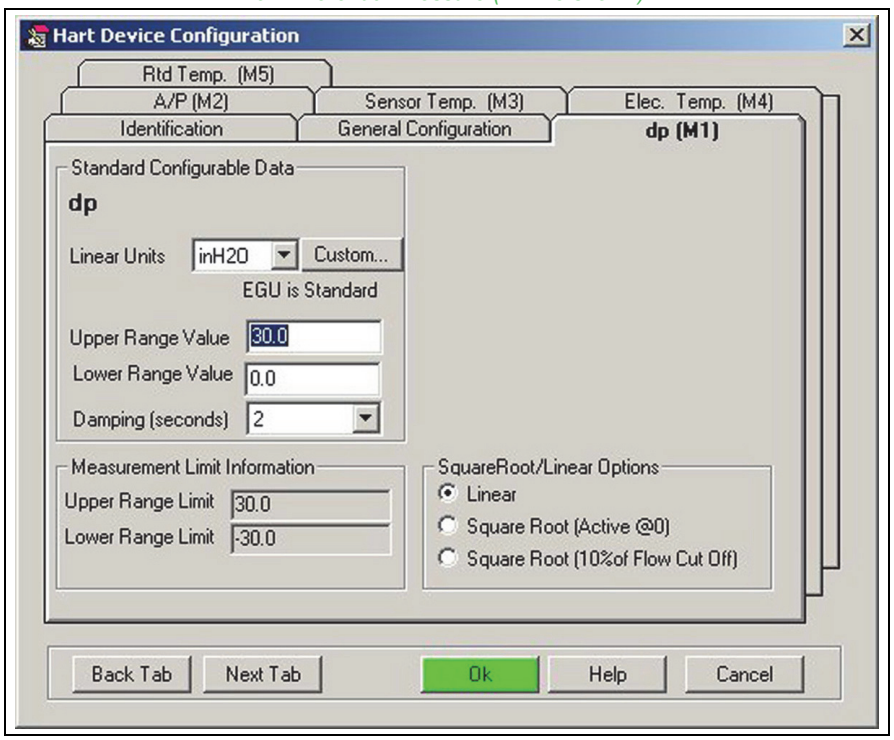


Figure 2. Typical Device Configuration Screen for Flow (IMV30 only)

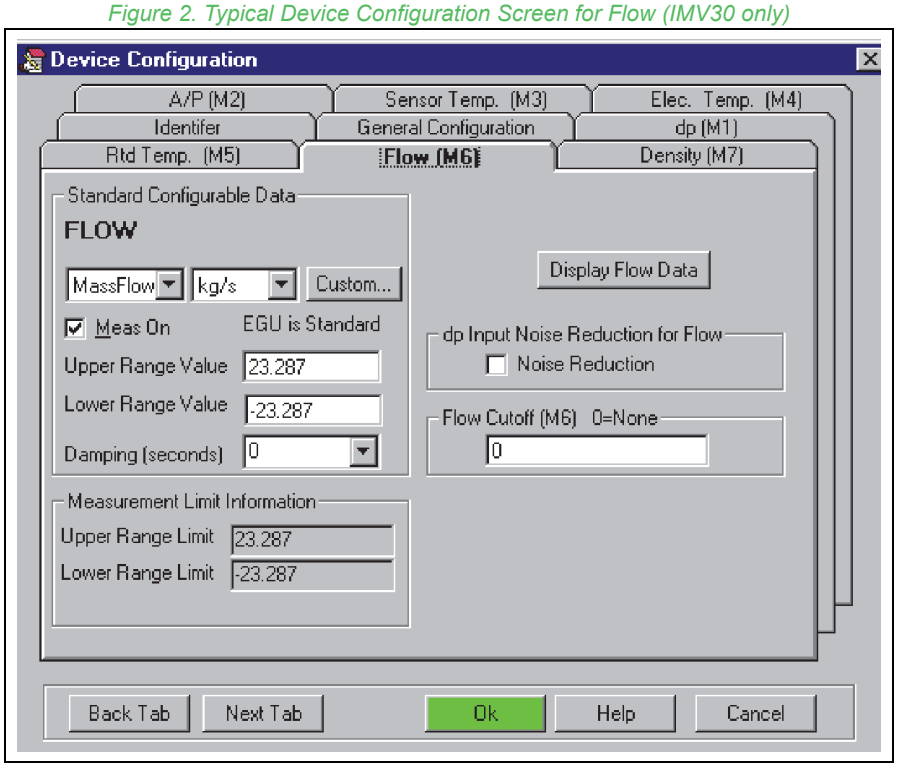


Figure 3. Orifice Plate Type Selection Screen (IMV30 only)

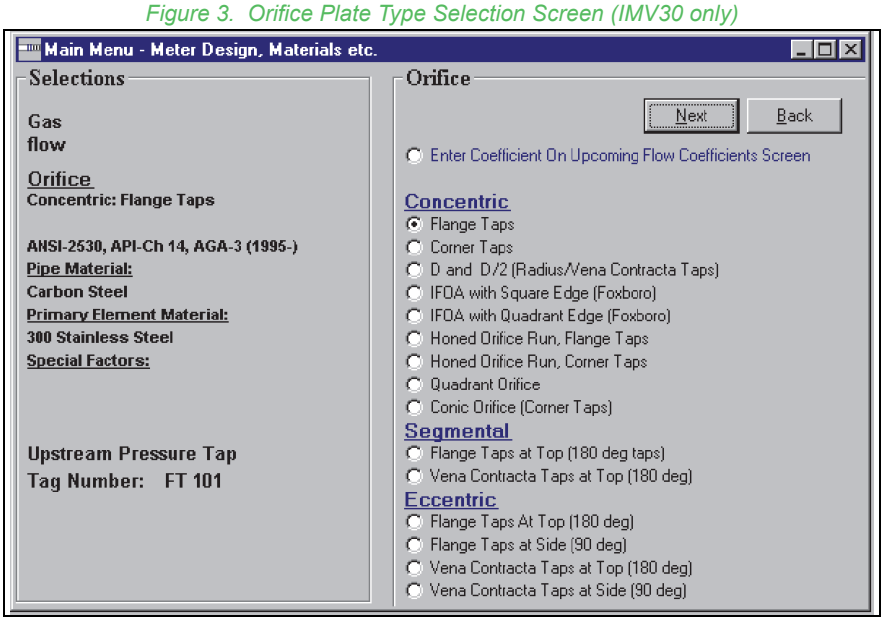


Figure 4. Sample Scan Data Screen (IMV31 only)

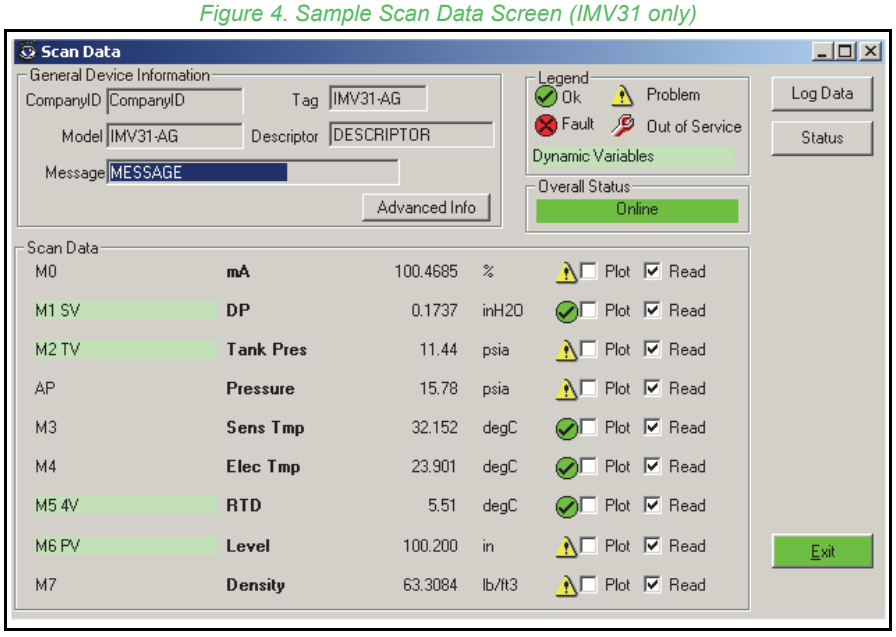
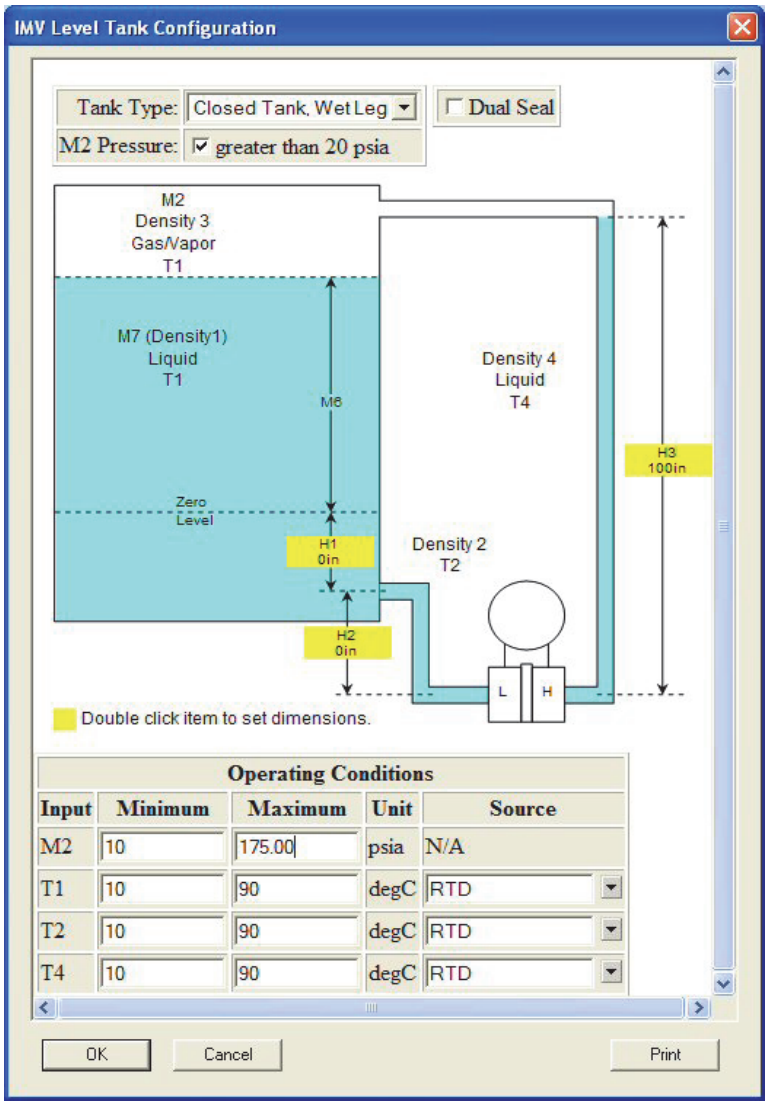


Figure 5. Sample Level Configurator Screen (IMV31 only)



FUNCTIONAL BLOCK DIAGRAMS

(See Figures 6 and 7.)

Figure 6. Functional Block Diagram with FoxCom Modem, with and without Optional Power Supply

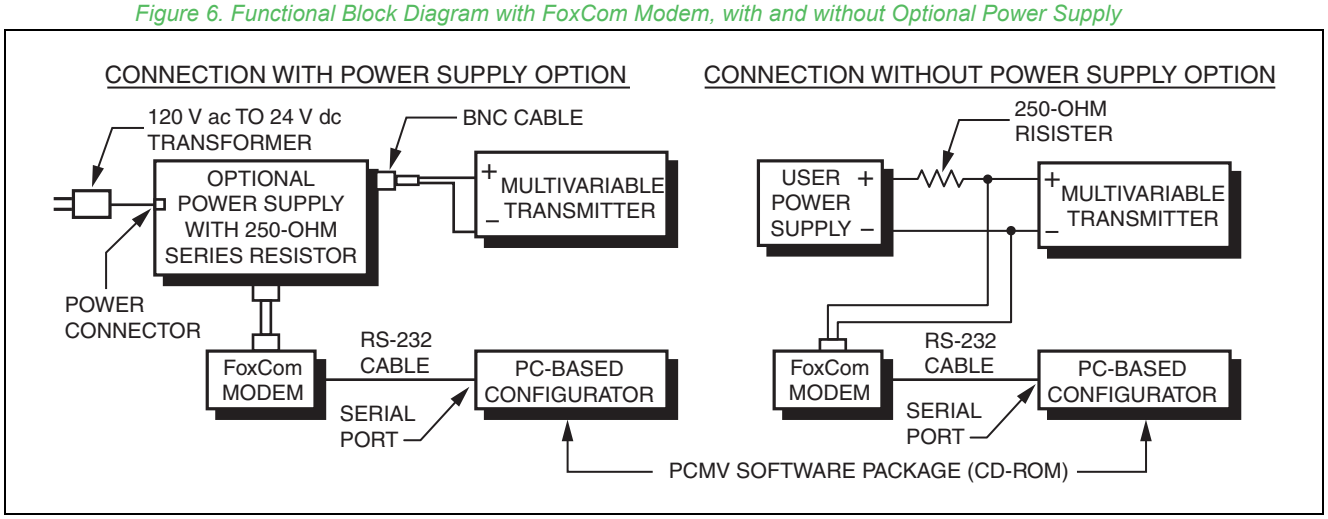
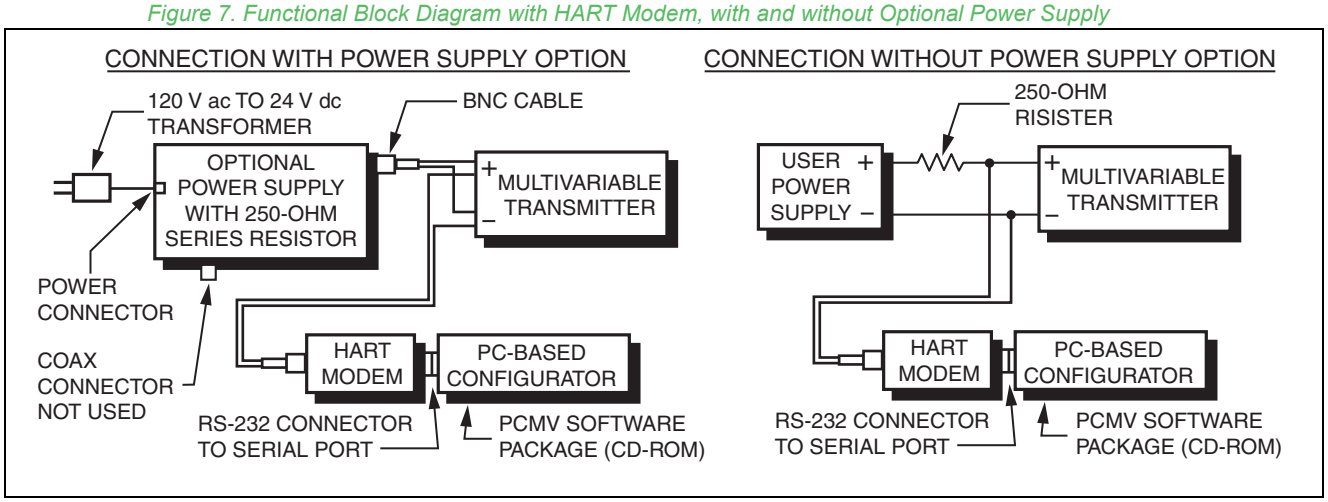


Figure 7. Functional Block Diagram with HART Modem, with and without Optional Power Supply



OPTIONAL SELECTIONS

Modems - FoxCom or HART Selections

FoxCom and HART modems are used with a Windows-compatible PC that has a serial communications port. Communications with Intelligent Devices use proven frequency shift keying (FSK) techniques that do not affect the device output signal.

The FoxCom modem is provided with a 0.3 or 1.5 m (1 or 5 ft) cable assembly for connection to a PC-based configurator. The modem weighs approximately 0.1 kg (0.25 lb), and can be attached to the PC or any convenient flat, hard surface using the fabric fasteners with loops and hooks provided with the modem kit. Specify Modem Code D for a FoxCom modem.

The HART modem plugs directly into the PC (a standard RS-232 cable can be used, if preferred).

The modem weighs approximately 0.04 kg (0.1 lb). Its dimensions are approximately 67 x 34 x 16 mm (2.6 x 1.3 x 0.6 in). Specify Modem Code T for a HART modem.

Power Supply Option

The power supply is used to power the transmitter during calibration and configuration if a separate transmitter power source is not available. It is not required to power the modem because modem power is obtained through the serial port connection to the PC. The supply comprises a 120 V ac to 24 V dc converter with an integral cable that connects to the 24 V dc supply unit. A cable assembly interconnecting the power supply and field device is also provided. Specify Optional Selection -C

MODEL CODE

Description	Model
PCMV Configurator for use with IMV25 and IMV30 Multivariable Transmitters (a)	PCMV
Software Language	
English	-AE
Modem Selection	
FoxCom Modem	D
HART Modem	T
Both FoxCom and HART Modems	B
None - User Supplied	N
Optional Selection	
Power Supply (b) (c)	-C
Example: PCMV-AED-C	

a. The PCMV Configurator software package is supplied on CD and is suitable for either HART or FoxCom protocol transmitters.

b. Power supply for transmitter is 120 V ac, 60 Hz to 24 V dc converter; for use during calibration and configuration.

c. Not available with Modem Selection Code N (no Modem).

ORDERING INSTRUCTIONS

1. Model Number
2. Tag and Application

REFERENCE DOCUMENTS

PSS 2A-1C15 A	IMV30 Multivariable Transmitter (FoxCom/HART)
PSS 2A-1C15 B	IMV25 Multivariable Transmitter (FoxCom/HART)
PSS 2A-1C15 C	IMV31 Multivariable Transmitter (HART)

ADDITIONAL PRODUCTS

These product lines offer a broad range of measurement and instrument products, including solutions for pressure, flow, analytical, temperature, positioning, controlling, and recording. For a list of these offerings, visit our web site at:

www.schneider-electric.com

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