Process Instrumentation

Field Instruments for Process Automation
July 2012 Supplement

SIEMENS

Introduction

The Process Instrumentation & Analytics Business Segment of Siemens Industry, Inc. is a leader in providing innovative solutions to process instrumentation and control challenges. It is the operational center for Siemens' process instrumentation and control business in North America. The Process Instrumentation business provides a complete line of reliable measurement and control products, including: transmitters for level, pressure, temperature, and flow; loop controllers; valve instrumentation products, regulators and relays; process protection instruments; weigh feeders and belt scales. Siemens Process Instrumentation solutions help increase productivity and plant safety, reduce time-to-market and improve product quality across the process industries, such as chemical, pharmaceutical, bio-pharmaceutical, oil & gas, water and wastewater treatment, mining, pulp & paper and refining.

This catalog supplement includes only those items manufactured in Spring House, sold here in the US, and not covered in the Siemens Field Instruments FI 01 catalog. If you do not find the product you are looking for in this supplement, please contact our factory for more information. We will be happy to connect you with a sales representative in your area that covers the products and services that you need.

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Process Instrumentation
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Model 353 Process Automation Controller

with Ethernet Communication (Design Level B)

Introduction

Features & Benefits

- Affords easy integration with and migration to existing systems
- Multiple loop capabilities for indication, control, logic, or sequencing accommodate comprehensive process control needs
- Scalable hardware provides lower entry costs, without limiting future needs
- Full configuration capability via front faceplate push-buttons allows quick field changes without requiring additional tools
- Ethernet communication is standard, providing peer-to-peer communications.
- RS485 MODBUS® network connection allows multi-drop wiring for operation, monitoring, troubleshooting, or configuration from a system workstation
- Front panel PC connection accommodates local configuration, monitoring, or troubleshooting using the graphical configuration software
- Real Time Clock provides status ouput based on time of day. Removeable configuration media stores a complete backup copy of the control strategy configuration
- Factory Configured Options (FCOs) facilitate fast configuration for common applications
- Password protection provides individual security for various plant personnel
- Graphical configuration program provides a choice of function block or ladder logic configuration
- Short case design allows mounting in 12" deep cabinets
- Coated circuit boards ensure reliable operation and environmental integrity

Description

The Model 353 Process Automation Controller is a stand-alone, microprocessor-based industrial controller designed for a broad range of process applications. It can serve as a simple single-loop controller or as a multi-loop controller with complete control and logic functions for a small unit batch or continuous process. The Model 353's standard Ethernet communication enables it to function as an integral element in a plant system.

Loops are configured for control, sequence, or logic as needed within the Model 353. Each configured loop can have a virtual operator display that is viewed locally using the LOOP button on the faceplate and is mapped to network communication for a plant operator station. Alarm management is handled using the L (Loop) & S (Station) indicator lights along with the priority assignments and flashing options of each alarm.

User defined pushbuttons in each loop can be used for traditional functions, such as Console/Local, External/Internal Switching or individual user requirements, such as Start, Stop or Jog. Multiple variables are displayed on the operator faceplate and viewed using the D button. User defined units assigned to each variable are displayed via the UNITS button. Complete configuration of the Model 353 is available using buttons located behind the flipdown ID door.

A built-in library of preconfigured control strategies (FCOs) enable selection of common basic controller types for quick field set-up. A large selection of reusable function blocks enable simple changes to FCOs or the design of a custom control strategy to meet the needs of specific process control application. The Model 353 Configuration Utility accommodates design, downloading, uploading, and on-line monitoring capabilities for improved management of controller configurations. In addition, sequencer/logic loops can be configured and monitored on-line in ladder diagram format for those more familiar with this language.

Model 353 Process Automation Controller

with Ethernet Communication (Design Level B)

Technical data

Specifications

Electrical & Environmental

Power Supply

Standard: 120/240 Vac (85 to 264 Vac); 47 to 63 Hz
Optional: 24 Vdc, +20%, -15%

Power Requirements

25 Watts, 40 VA (max.)

2-Wire Transmitter Power

Voltage: 25 Vdc ±3V
Current: 120 mA, short circuit protected

Hazardous Area Approvals Pending

FM/CSA: Class I, Division 2, Groups A, B, C & D
ABS
CE
(Consult Siemens for current approvals)

Ambient Temperature Range

Operating: 32 to 122°F (0 to 50°C)
Storage: -40 to 185°F (-40 to 85°C)

Climate Conditions - IEC654-1

Class B3 - Standard Mounting
Class D1 - Installed per instructions in Class D1 enclosure

Electrostatic Discharge

IEC 801-2

RFI Protection

IEC 801-3

Electrical Transients

IEC 801-4

Net Weight

6 lbs.

Heat Dissipation

80 BTU/Hr.

Scan Time

Varies with configuration: 20 msec (minimum)

Inputs

Analog Inputs (non-isolated)

1-5 Vdc, 4-20 mA with included 250 resistor
MPU Controller Board: Qty 3
I/O Expander Board: Qty 1

Digital Inputs (isolated)

0-1 Vdc OFF, 15-30 Vdc ON
MPU Controller Board: Qty 3
I/O Expander Board: Qty 1

Analog Input, Universal (isolated)

Thermocouple: J, K, T, E, S, R, B & N
RTD: DIN 43760, US (NBS126), JIS C-1604
Slidewire: 500-5000
Ohms: 0-5000
Millivolt: Narrow: -19.0 to 19.0 mV; Wide:-30.0 to 77.0 mV
I/O Expander Board: Qty 2

Digital/Frequency Input, Universal (isolated)

Frequency Range: 0 to 25,000 Hz
Minimum Operating Frequency: 0.05 Hz
ON Voltage: 4-30 Vdc
OFF Voltage: 0-1 Vdc
Input Current: <5 mA @ 30 Vdc
I/O Expander Board: Qty 2

Outputs

Analog Outputs (non-isolated)

4-20 mA into 800 ohms (max.)
MPU Controller Board: Qty 2
I/O Expander Board: Qty 1

Digital Outputs (non-isolated)

Open Collector Transistor (emitter @ station common)
Load Voltage: 30Vdc (maximum)
Load Current: 100 mA (maximum)
Off State Leakage Current: <200 A @ 30 Vdc
MPU Controller Board: Qty 2

Relay Outputs (SPDT)

Contact Rating: 5A @ 120 Vac, 2.5 A @ 230 Vac, Resistive Load
Minimum Current: 100 mA @ 10 mVdc; 150 mA @ 50 mVac
I/O Expander Board: Qty 2

Optional Boards

Local I/O Expander

Communication

Front configuration port: RS232 MODBUS
Rear port: RS485 MODBUS
Ethernet: MODBUS/TCP

Standard Configuration

Nine of the most common control strategies have been stored in a built-in library and can be selected with a single pushbutton entry. These control strategies, which can be customized to accommodate individual needs, are:

- Single-Loop Controller with Tracking Setpoint
- Single-Loop Controller with Fixed Setpoint
- Ratio Set Controller with Operator Setpoint Limits
- Single-Loop Controller with Operator Setpoint Limits
- Cascade Loop Controller
- Cascade Loop Controller with Operator Setpoint Limits
- External Set Controller with Tracking Setpoint
- External Setpoint with Fixed Setpoint
- Dual Loop controller

Function Blocks

Control strategies within the Model 353 are configured using the following function blocks, which are stored in memory. The total number and type of I/O function blocks available in the Model 353 depend on the installed hardware, and when available, can be used as needed within a configured loop. Loop function blocks can be used in the quantities indicated within each loop. Each configured loop can contain one operator display block & one controller block*.

Station Hardware I/O

AIN1-4 - Analog Input
AINU1-2 - Analog Input Universal
AOUT1-3 - Analog Output
DIN1-4 - Digital Input
DINU1-2 - Digital Input, Universal
DOUT1-2 - Digital Output
ROUT1-2 - Relay Output

Ethernet Peer-To-Peer I/O

AIE01-32 - Analog Input Ethernet
AOE01-32 - Analog Output Ethernet
AWE01-32 - Analog Write Ethernet
CIE01-32 - Coil Input Ethernet
CWE01-32 - Coil Write Ethernet
DIE01-32 - Digital Input Ethernet
DOE01-32 - Digital Output Ethernet
DWE01-32 - Digital Write Ethernet

Loop Function Blocks

A/M - Auto/Manual
ACS01-99 - ARC Cosine
ADD01-99 - Addition
AGA3 - Orifice Metering of Natural Gas
AGA7 - Measurement of Gas by Turbine Meters
AGA8 - Compressibility Factors of Natural Gas
ALARM - Alarm
AND01-99 - AND Logic
ASN01-99 - ARC Sine
ATD01-05 - Analog Trend Display
ATN01-09 - Arc Tangent
BATOT - Batch Totalizer
BATSW - Batch Switch
BIAS - Bias
CHR01-99 - Characterizer
CMP01-99 - Comparator
COS01-99 - Cosine
DAM01-99 - Deviation Amplifier
DIV01-99 - Division
DNC01-99 - Divide by N Counter
DTM01-99 - Dead Time Table
DYT01-99 - Delay Timer
E/I - External/Internal Transfer
ESL - Event Sequence Logger
EXP01-99 - Natural Exponentiation
EXT01-99 - Exponentiation
FTG01-99 - Falling Edge Trigger

GB01-99 - Gain & Bias
HLD01-99 - Hold
ID* - ID Controller
LL01-99 - Lead/Lag
LMT01-99 - Limit
LN01-99 - Natural Logarithm
LOG01-99 - Logarithm Base 10
MTH01-99 - Math
MUL01-99 - Multiplication
NND01-99 - NAND Logic
NOR01-99 - NOR Logic
NOT01-99 - NOT Logic
ODC* - Operator Display for Controllers
ODS* - Operator Display for Sequencers
ODA* - Operator Display for Analog
ODD* - Operator Display for Discrete
ODP* - Operator Display for Pushbutton
ONOFF* - ON OFF Controller
OR01-99 - OR Logic
ORSL - Override Selector
OST01-99 - One Shot Timer
PB1SW - PB1 Switch
PB2SW - PB2 Switch
PB3SW - PB3 Switch
PCOM - Phase Communication
PD* - PD Controller
PID* - PID Controller
PIDAG* - PIDAG Controller
PRSEQ - Program Sequencer
QHD01-99 - Quickset Hold
RATIO - Ratio
RCT01-99 - Repeat Cycle Timer
RLM01-99 - Rate Limiter
ROT01-99 - Retentive On Timer
RSF01-99 - RS Flip-Flop
RTG01-99 - Rising Edge Trigger
RTT01-99 - Real Time Clock Trip
SCL01-99 - Scaler
SEL01-99 - Signal Selector
SETPT - Setpoint
SIN01-99 - Sine
SPLIM - Setpoint Limit
SRF01-99 - SR Flip-Flop
SRT01-99 - Square Root
SUB01-99 - Subtraction
TAN01-99 - Tangent
TH01-99 - Track & Hold
TOT01-99 - Totalizer
TSW01-99 - Transfer Switch
XOR01-99 - Exclusive OR Logic

NOTE:
Each configured loop can have one operator display block and one controller block.

Model 353 Process Automation Controller

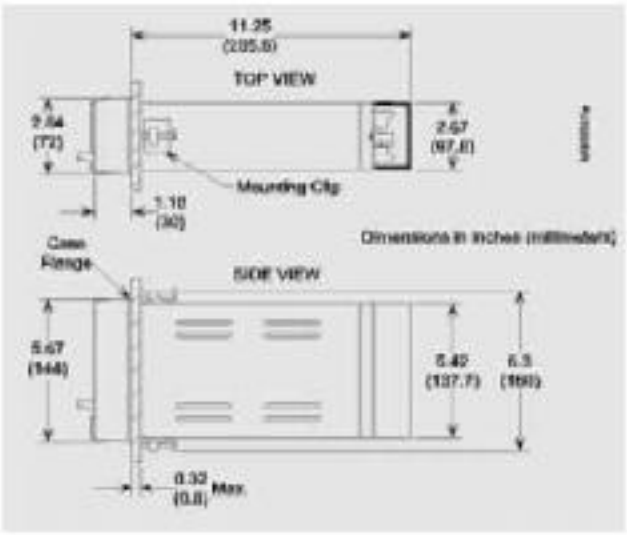
with Ethernet Communication (Design Level B)

Accessories

Accessories

Graphical Configuration Software (TGX: CONFIG-V4.00, Consult Siemens for latest version) Windows® 95/NT™/2000/XP software for configuration of the Model 353 and creation of the function block diagram. Configurations can be transferred using the built-in front panel connector, the Modbus network, or the Multi Media card.

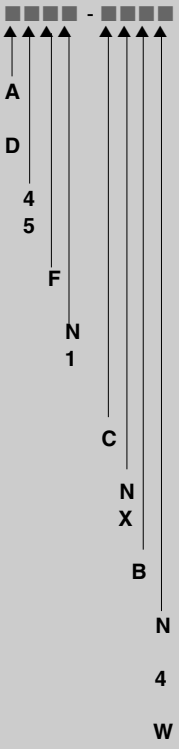
Mounting Dimensions



Model Number

Order No.

Process Automation Controller w/Ethernet Communication — **TGX: 353**



Controller Board
- 120/240 Vac (85-264 Vac); 47-63 Hz
- 24 Vdc, +20%, -15%

Mounting Case
- Standard Case with Ethernet Connector
- High Shock & Vibration Case w/ Ethernet Connector

Operator's Display Panel
- Fixed Analog & Digital Displays

Expander Board
- Not Required
- Local I/O Expander (T/C, RTD, Frequency, Relay, ..)

Multi Media Card
- MMC

ModificationOption
- Not required
- Controller modified as detailed in order Bill of Material)

Design Level
- Design Level B

Electrical Approval
- Not required
- FM/CSA Class I, Div. 2, Groups A, B, C, D suitable for non-incendive (CE Compliant)
- FM/CSA Class I, Div. 2, Groups A, B, C, D suitable for non-incendive (CE Compliant & ABS Approved)

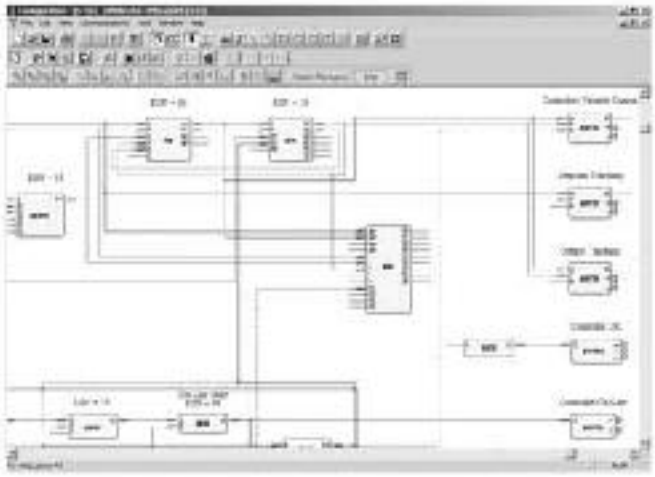
Sample Model Number — **TGX:353** — **A4 FN CNB 4**

iConfig™ Controller Configuration Utility

Introduction

Features & Benefits

- Windows® XP or 7 operating system provides powerful graphical interface
- Automatic line routing and interloop wiring reduces overall drawing time
- User selected tag names in a reference list allow easy interconnection between continuous and discrete loops
- Choice of function block and ladder logic format provides application versatility
- Easy cut, copy and paste capabilities allow control strategies to be duplicated and shared between multiple controllers for reduced configuration time
- User defined line styles and colors permit visual separation of continuous and analog signals for easier understanding of control loops
- Line layering capability allows viewing of continuous and discrete signals independently or together
- Comprehensive drawing package facilitates creation of text comments and graphical illustrations for better understanding of the control strategy
- Application Library provides quick start-up and base line for more complex configurations



Description

The iConfig™ Configuration Utility provides the tools to create a loop controller graphical interface and manage a loop controller configuration. Based on the 32-bit Windows technology, the software allows configuration of discrete control in function block or ladder logic. Moreover, comprehensive drawing capabilities allow the inclusion of comments and illustrations that further explain the control circuit to be included.

Loops for continuous control are configured in function block form, while discrete loops are configured in either ladder logic or function block. The software's reference list allows user's to create tags that interconnect discrete signals between function block loops and contacts or coils in the ladder logic. Interconnecting signals from comparators or alarms on measured variables, such as pressure, flow and temperature, eliminate the need for external pressure switches or thermal switches.

Depending on the user's preference, function block interconnection can be performed via Windows-based dialog boxes or point and click wiring with a cursor. A dynamic drag and drop feature allows user to easily move function blocks to create an intuitive signal flow design. Function block parameters are entered and modified via clear dialog boxes.

For documenting and archiving configurations, the configuration utility supports a variety of printing options. Standard print features, such as portrait and landscape, various paper sizes, and print preview are supported. In addition to graphical view printing, a list of all the parameters configured in the station can be printed. This list permits easy troubleshooting during start-up or maintenance.

To order the iConfig Configuration Utility kit, which includes installation CD, the user's manual, and a cable to connect a PC to the front port of the Model 353, specify part P/N iconfig Vx.xx[1].

System Requirements

- Model 353 with software version 1.2 or higher
- Windows XP or 7
- Pentium 600 Mhz or higher processor
- 512 MB of memory
- 1 GB of free disk space
- CD Rom Drive

[1] xx specifies the software's revision number. This will be defined by Siemens as the latest revision.

Model 353 Process Automation Controller Ethernet Remote I/O

Features & Benefits

- Web Browser Configuration enables simple setup and calibration without the need for special configuration or calibration software.
- Ethernet Protocol allows the use of standard Ethernet network hardware and cables.
- Direct Network Interface. Each module has its own built-in micro controller for Ethernet communication thus eliminating the need for bus couplers or common bus interfaces.
- Complete Isolation of the I/O, power, & network circuits provide easier installation including greater improved safetyand noise immunity.
- Network Security is provided by password protection for configuration & calibration.
- Wide Ambient Temperature Range provides reliable operation from -20 to 70°C.
- Simple System Integration provided by standard 353 function blocks enable configuration of update rates, range units, engineering units, etc in less time.
- Wide Range of Module Types including Current & Voltage inputs; Discrete inputs and outputs; Thermocouple, RTD, ACCurrent, & Resistance inputs solve complete I/O needs.

Description

These modules will extend the I/O of the 353 controller in applications requiring larger data collection. Modules transfer data using standard Ethernet networking techniques.Modules can be mounted local to the controller or in remoteareas. A wide range of analog and discrete modules are available to meet most process applications.

Model 353 process Automation Controller Ethernet Remote I/O

Ordering data

Model Number	Order No. A6X:
Remote I/O	
Ethernet I/O Modules	
• DC Current Input - 6 Differential Channels [961EN-4006]	30001750
• DC Voltage Input - 6 Differential Channels [962EN-4006]	30001751
• DC Current Input - 12 Single Ended Channels [963EN-4012]	30001752
• DC Voltage Input - 12 Single Ended Channels [964EN-4012]	30001753
• Thermocouple/MV Input - 4 Channels [965EN-4004]	30001754
• Thermocouple/MV Input - 6 Channels [965EN-4006]	30001755
• RTD/Resistance Input - 4 Channels [966EN-4004]	30001822
• RTD/Resistance Input - 6 Channels [966EN-4006]	30001823
• DC Current Output - 4 Channels [972EN-4004]	30001824
• DC Current Output - 6 Channels [972EN-4006]	30001827
• DC Voltage Output - 4 Channels [973EN-4004]	30001829
• DC Voltage Output - 6 Channels [973EN-4006]	30001831
• Discrete Input - 12 Channels [981EN-4012]	30001832
• Discrete Output - 12 Channels [982EN-4012]	30001833
• Discrete Input/Output - 12 Channels [983EN-4012]	30001835
Ethernet I/O Module Accessories	
• Ethernet Switch - 5 Port [900EN-5005]	30001964
• AC Current Sensor [5020-350]	30001965
• Ethernet Cat5 Cable - 3 ft. [5035-355]	30001966
• Ethernet Cat5 Cross-Over Cable - 5 ft. [[5035-360]	30001967
• Universal Power Supply - 24Vdc/600mA [PS5R-B24]	30001969
• Universal Power Supply - 24Vdc/2.1A [PS5R-D24]	30001970
• Universal Power Supply - 24Vdc/5A [PS5R-F24]	30001955
• DIN Rail - 3.0 in. long [DIN RAIL 3.0]	30001956
• DIN Rail - 16.7 in. long [DIN RAIL 16.7]	30001957
• Rack Mount Kit - 19 in. [20RM-16-DIN]	30001958
• User Manuals on CD [5035-547]	30001959

Introduction

Features & Benefits

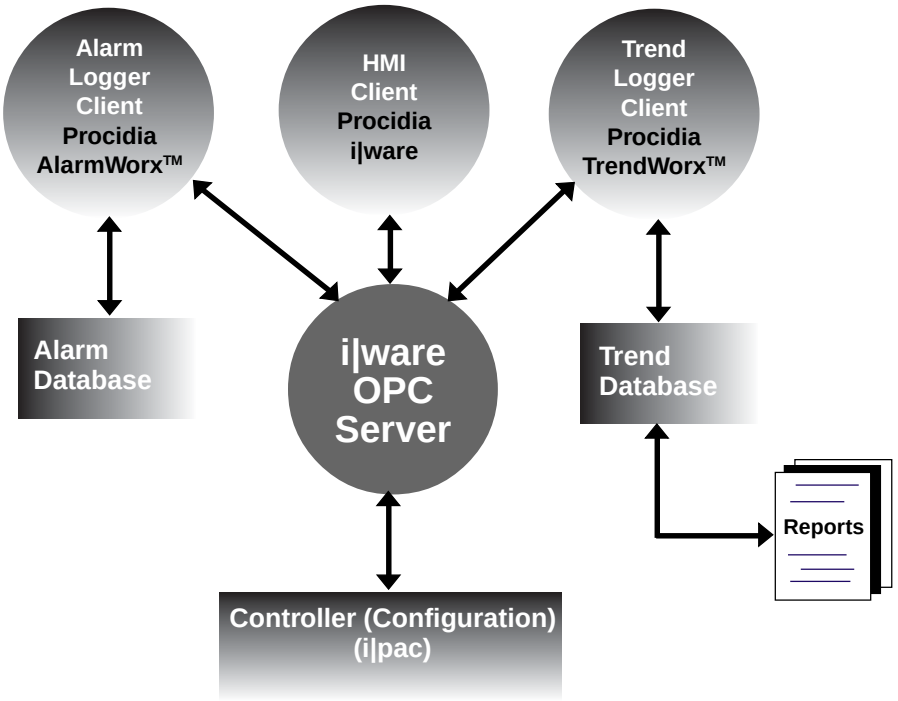
- Universal location for all process information so you only have to enter information once, which significantly minimizes manual errors
- The OPC data server automatically reads the network, identifies attached controllers, and generates a global system database within a few minutes
- i|ware OPC data server can be used with any OPC client to facilitate plantwide communications
- Ability to test communication with the controller prior to generating an HMI interface
- Support of other protocols, such as Moore's Local Instrument Link (LIL), Modbus, and Ethernet, to integrate with your other control systems and field devices
- Monitoring mode that allows on-line value viewing and checking

Description

i|ware server is an OPC-compliant data server that generates a system-wide global database with the click of a mouse. i|ware OPC server acts as the universal location for all of your process information, including tags, alarms and history. So, you only ever have to enter information once, which significantly minimizes the possibility of manual errors and cuts your configuration time in half.

The OPC data server automatically reads the network to see what controllers are attached and generates a global system database. This database maintains itself and updates live process variables, plus changes to the controllers, such as tag and range values. Your system database and HMI—complete with status screens, group displays, and control and sequencer faceplates—are automatically created from your control strategy data.

Because it is an OPC-compliant server, the i|ware OPC server integrates with the HMI and any other OPC-compliant clients to facilitate plant-wide communication. It also provides a standard mechanism to transfer data from one to the other. Besides decreasing your costs and increasing your bottom-line, this approach allows you to move to start-up more quickly.



i|ware for 353 Series Controller

Introduction

Features & Benefits

- Five levels of screens are automatically created, based on controller strategy, eliminating days of HMI development time
- 50 ms dynamic animation updates provide operators with up-to-the-minute information
- Powerful display creation and animation tools, coupled with an advanced symbol library, expedite operator interface customization
- Built-in expressions and calculations, as well as display, trending, and alarm management functions, deliver comprehensive operator information
- Scalable and fixed scale displays that allow information to be displayed in the form and manner required for a particular application
- Embedding of ActiveX® controls and OLE objects to display information from other systems and devices
- Ability to log, time-stamp, and store controller alarms and events on a PC hard drive for later review and analysis

Description

i|ware is a comprehensive operator interface—including status screens, group displays, control faceplates, and loop detail and tuning screens—that is automatically created from the controller database. That makes your job easier and significantly reduces costs by completely eliminating your initial HMI development effort. But, you can still add graphics and modify the screens that i|ware makes for you to customize the overall look and feel.

i|ware enhances the interface between client and server applications using a standard mechanism to transfer data from one to the other. The standard, OPC, facilitates plant-wide communication, because it integrates i|ware with any other OPC-compliant software or system. i|ware also includes Ethernet communications that eliminate the need for integration with fieldbus technology and dramatically reduce networking costs.

Enterprise Edition

The Enterprise Edition provides alarm monitoring and historical trending. The alarm and trend servers support a comprehensive list of features. ArchiveX viewers permit quick and easy customization of viewer display format. Alarm logging and trend repports are also available.

i|ware supports VBA scripting for custom applications. Login sercurity is available.

Specifications

Recommended Requirements

- i|station operator workstation
  - or -
- Plant Workstation
  - Pentium 2.0 GHz or higher processor
  - 1 GB RAM
  - 40 MB of available hard disk space for applications
  - 1 GB hard disk space for historical database
  - CD ROM drive
  - SVGA 800x600 resolution monitor (256 colors) or better
  - Microsoft Windows 95/98 or Windows NT 4.0 service release 6.0, XP Professional
  - Microsoft DCOM
  - Microsoft Internet Explorer version 3.02 or higher
  - Trend WorX32

Model Number	Order No.
i|ware	TGX:
iware PC Operator Interface Software Ver. 3.00	
• BasicV3.00_500pt	I WA R E B 0 5 V 3 0 0
• EnterpriseV3.00_500pt	I WA R E E 0 5 V 3 0 0
• EnterpriseV3.00_1500pt	I WA R E E 1 5 V 3 0 0
• EnterpriseV3.00_unlimited	I WA R E E U L V 3 0 0
• EnterpriseV3.00_TimeDemo_1yr_500pt	I WA R E E T D V 3 0 0
• OPCServers_Modbus_EN_LIL	I WA R E OP C V 3 0 0
iWare PC Operator Interface Software Ver. 3.00 Upgrades	
• BasicV3.00_500pt_Basic_500pt	I W U B 0 5 V 3 0 0 B 0 5
• EnterpriseV3.00_500pt_Basic_500pt	I WUE 0 5 V 3 0 0 B 0 5
• EnterpriseV3.00_1500pt_Basic_500pt	I WUE 1 5 V 3 0 0 B 0 5
• EnterpriseV3.00_unlim_Basic_500pt	I WUE UL V 3 0 0 B 0 5
• EnterpriseV3.00_500pt_Enterprise_500pt	I WUE 0 5 V 3 0 0 E 0 5
• EnterpriseV3.00_1500pt_Enterprise_500pt	I WUE 1 5 V 3 0 0 E 0 5
• EnterpriseV3.00_unlim_Enterprise_500pt	I WUE UL V 3 0 0 E 0 5
• EnterpriseV3.00_1500pt_Enterprise_1500pt	I WUE 1 5 V 3 0 0 E 1 5
• EnterpriseV3.00_unlim_Enterprise_1500pt	I WUE U L V 3 0 0 E 1 5
• EnterpriseV3.00_unlim_Enterprise_unlim	I WUE U L V 3 0 0 E UL

Controllers

i|station for 353 Series Controller

Introduction

Features & Benefits

- Proven operator interface prepacked with i|config, i|ware, and i|ware OPC server, reduces system start-up and test time
- - 15" color Thin Film Transistor (TFT) 1024 x 768 LCD
  - Desk-top operation for greater application versatility
- Industrial-grade luminance of 200 cd/m2 and backlight lifetime of up to 20,000 hours that afford a long, trouble-free life

2

Description

i|station is an industrial operator workstation with pre-installed user interface and configuration software, allowing you to connect to a live process right away. This sleek unit, which features an analog resistive screen with a guaranteed 30 million-touch lifetime, boasts a wide viewing angle for better operator observation.

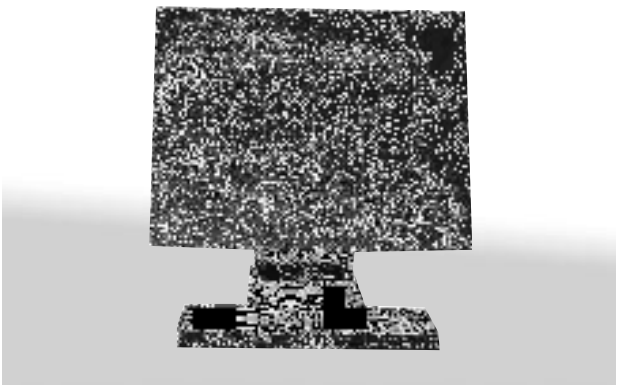
Designed for reliable operation in the harshest of industrial environments, i|station is built to NEMA 4/12 and IP65 specifications. It also features advanced communication capabilities via four serial ports and an onboard Ethernet controller. Plus, i|station's modular design reduces your maintenance and upgrade effort to little more than removal of the front panel.

Specifications

i|station WINDOWS XP

General

Display Type: TFT color LCD
Size: (diagonal) 15" (381 mm)
Max. resolution: 1024 x 768
Max. colors or grayscales: 256 K
Dot size: 0.012" x 0.012" (0.297 x 0.297 mm)
Luminance: 200 cd/m2
Viewing angle: 100°
Temperature: 32 to 122°F (0 to 50°C)
VR controls: Brightness
Simultaneous mode: Yes
LCD MTBF: 50,000 hours
Backlight MTBF: 20,000 hours
CPU: Intel® Pentium 2.4 GHz
Dimensions:
16.54" x 12.72" x 4.17" (420 x 323 x 106 mm)
Weight: 14.3 lbs. (6.5 kg)
Front panel protection: IP65/NEMA4-compliant
HDD:
IDE HDD interface [2.5" (63.5 mm) HDD bay]
Memory: 1 GB



Network (LAN): Novell NE2000 compatible,
100/01Base-T interface
I/O ports:
- 4 serial ports: 3 RS-232, 1 RS-232/422/485
- 1 parallel port
- PCMCIA Type II x 2, Type III x 1
- 1 PS/2 mouse and keyboard interface
- Mic-in, Line-in, Line-out, and game port
- 2 USB ports

Bus expansion:
One expansion slot for half-size PCI/ISA card

Power Supply

Output rating: 80 W (max.) AC 85 to 264 V inlet
Input voltage: 115 to 230 Vac at 47 to 63 Hz
Output voltage: +5 V at 12 A, +12 V at 1 A
MTBF: 50,000 hrs
Safety: Meets UL, CSA, CE

Environmental

Operating temperature: 32 to 122°F (0 to 50°C)
Relative humidity:
10 to 95% at 104°F (40°C), non-condensing
Shock: 10 G peak acceleration (11 msec. duration)
EMI: Meets FCC/CE Class A

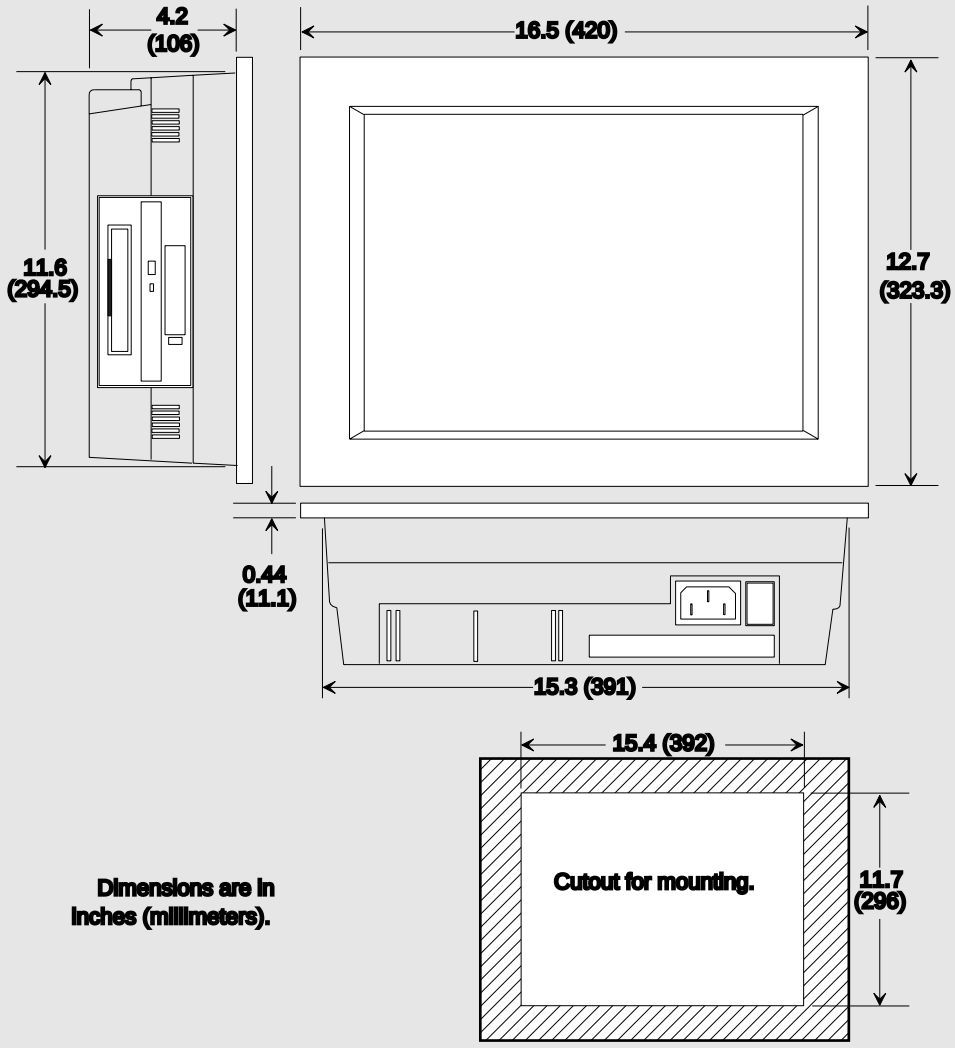
Touchscreen

Type: Resistive
Resolution: Continuous
Light transmission: 75%
Controller: RS-232 interface
Power consumption: +5 V at 200 mA
Lifetime: 30 million touches

Accessories

- Table top stand
- Keyboard & mouse
- DB9F/MJ11 cable adapter
- MJ11 cable assembly

Mounting Dimensions



Ordering data

Model Number	Order No.
iStation	TGX:
iStation Flatpanel LCD Operator Interface	
• iStation 15” Monitor, WinXP (includes iWARE-B05-V3.00 & iCONFIG)	ISTATION1501D
• iStation 15” Monitor, WinXP (includes iWARE-E05-V3.00 & iCONFIG)	ISTATION1502D
• iStation 15” Monitor, WinXP (includes iWARE-E15-V3.00 & iCONFIG)	ISTATION1503D
• iStation 15” Monitor, WinXP (includes iWARE-EUL-V3.00 & iCONFIG)	ISTATION1504D
iStation Accessories	
• Table Top Mounting Stand (include with 15” Desk Top Applications)	16357-264
• Keyboard (include with all i\stations)	16357-262
• Y Cable Adapter for KB & Mouse (included with iSTATION)	16357-261
• Mouse (included with all I\stations)	16357-263

Introduction

Features & Benefits

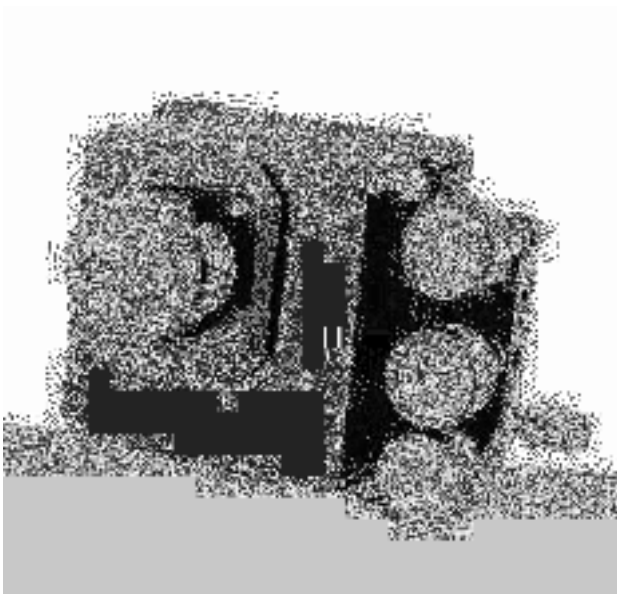
- Universal design and choice of interchangeable NAMUR IEC 534-6 rectilinear VDI/VDE 3845 rotary mountings provide wide application flexibility
- Double-acting or single-acting service and split ranging afford application versatility in a single unit
- Non-interaction of the zero and span adjustments and CAMLOC (TM) cam locking mechanism significantly reduce calibration and setup time
- Modular design reduces inventory because it allows interchangeable spare parts
- Comes standard with 3 cams, linear, quick opening and equal % for application versatility

Description

The Series 760 Valve Positioners provide a cost effective universal approach to your valve control. Their modular concept allows all models to be built on the base pneumatic unit (Model 760P). The electro-pneumatic model (Model 760E) is created by adding an I/P transducer to the base pneumatic unit, and a wide range of accessories easily installs inside the unit.

The 760 base pneumatic unit provides cam characterization, split ranging, direct or reverse action, and single or double acting without requiring additional parts. Key design features include non-interaction of the zero and span adjustments.

Series 760 Valve Positioners include provisions for internal limit switch mounting and position feedback devices without requiring additional housings. Thus, the need to stack housings that impede access to the main enclosure are eliminated.

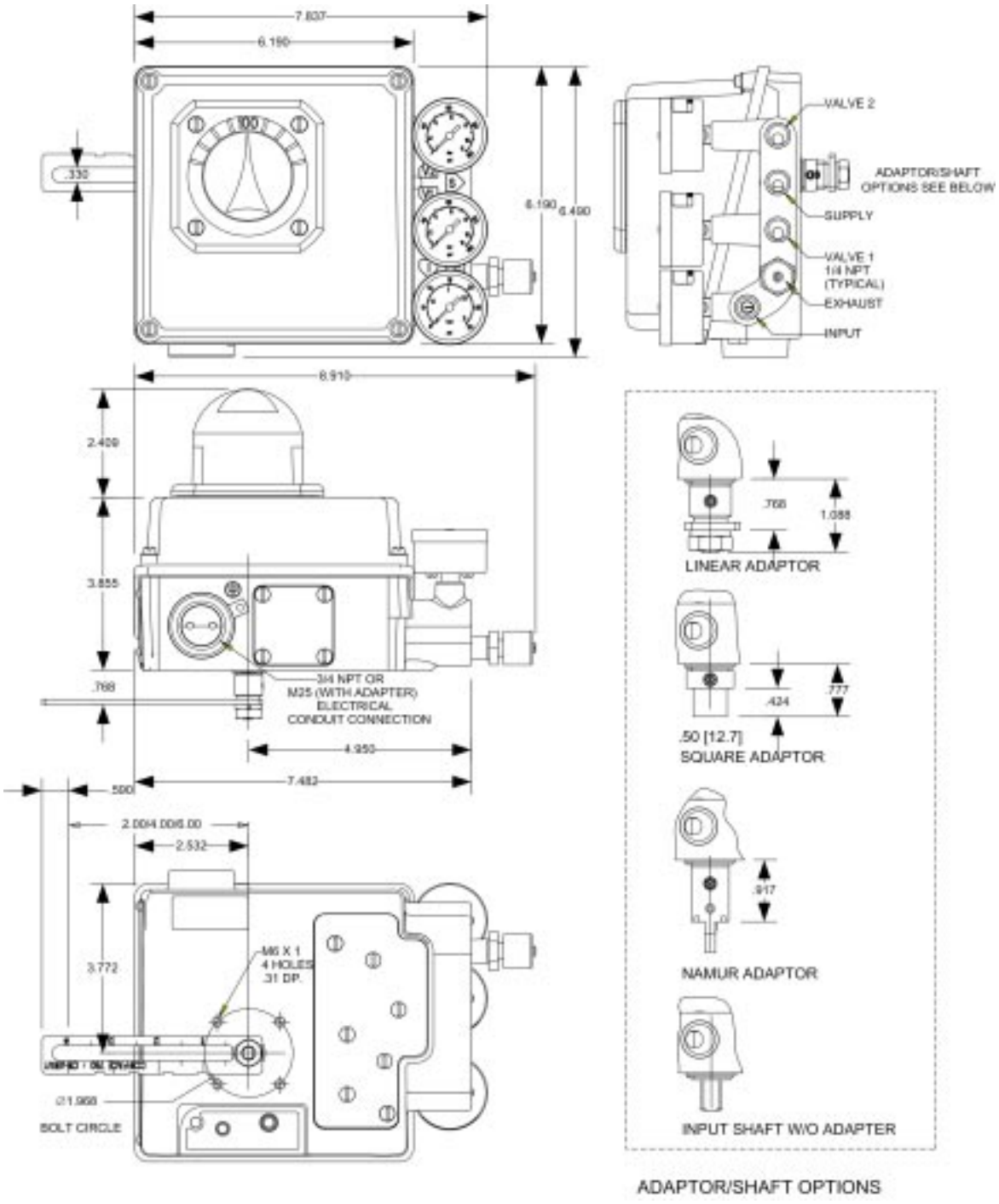


A spool valve is used to load the actuator for positioning in response to an input signal. A characterized cam provides mechanical feedback. There are linear, equal percentage and quick opening operation cam profiles, and a blank profile cam is available for custom applications. Rectilinear action length can range from 1/2 inch to 6 inches.

The feedback shaft and characterized cam can be replaced in the field to configure the positioner for use with either a rectilinear or rotary actuator. No additional parts are necessary to change between single or double acting actuators or direct or reverse action.

Technical data

Mounting Dimensions



ADAPTOR/SHAFT OPTIONS

Specifications

Functional Specifications

Temperature Range

760P: –40 to 185°F (–40 to 85°C)
–4 to 185°F (–20 to 85°C)
High temp. option available to 300°F (148°C)
760E: –40 to 167°F (–40 to 75°C)
–4 to 167°F (–20 to 75°C)
with optional Viton® dynamic elastomers

Ingress

NEMA 4X, IP 65

Connections

Pneumatic – 1/4" NPT
Gauge – 1/8" NPT
Electrical – 3/4" NPT, 25mm
Exhaust – 1/4" NPT

Finish

Epoxy/Polyester Powder Coat

Output Configuration

Single or Double Acting

Action

Direct or Reverse

Supply Pressure

150 psig max.

Air Consumption

Standard Spool: 0.5 scfm typical
Low Gain Spool = 0.5 scfm
High Flow Capacity Spool: 1.0 scfm (typical)

Flow Capacity (at 60 psi with 25% drop)

9.0 scfm (Cv = 0.3) Standard
18.0 scfm (Cv = 0.6) Optional

Input Signal

760P: 3-15 psig, 3-27 psig, 50% split range
760E: 4-20 mA, 50% split range

Mechanical Feedback

90°, rotary std.
1/2" to 6" linear optional (longer lengths available on request)

Characterization

Equal %; Quick Opening; Linear

Pressure Gain

160:1@ 60 psig standard

Span

Adjustable –60% to +25% of normal span

Zero

Adjustable –10% to +60% of normal span

®Viton is a registered trade name of DuPont Performance Elastomers

Performance Specifications

Linearity (Independent)

760P: 0.5% of normal span (typical)
760E: 0.75% of normal span (typical)

Hysteresis

760P: 0.75% of normal span (typical)
760E: 1.0% of normal span (typical)

Deadband

Less than or equal to 0.25% of span

Repeatability

Within 0.5% of span

Supply Pressure Effect

Less than 0.2% of span for a 5 psi change in supply pressure

Hazardous Area Class Approval

Series 760 Approvals & Certifications
FM Approvals:
Intrinsically Safe:
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F and G
Class III, Division 1
When installed in accordance with Siemens drawing 15032-7602 rev.5
Non-incendive:
Class I, Division 2, Groups A, B, C, D
Suitable for:
Class II, Division 2, Groups F and G
Class III, Division 2

CSA Certification
Intrinsically Safe:
Class I, Division 1, Groups A, B, C, D
Class II, Division 1, Groups E, F, G
Class III, Division 1
When installed in accordance with Siemens drawing 15032-7620
Suitable for:
Class I, Division 2, Groups A, B, C, D
Class II, Division 2, Groups E, F, G
Class III, Division 2

CE
EN50081-1 and EN50081-2 Emission
EN61000-6-1 and EN60000-6-2 Immunity

ATEX Certified:
II 2G EEx ia IIC T4/T5/T6
II 3G EEx nL IIC T5
See ATEX Certificates for Service Restrictions
SIRA 03 ATEX 2577X
SIRA 03 ATEX 4578
Enclosure:
Type 4X, in accordance with NEMA Std. 250
Type IP65, in accordance with IEC Std. 529

Series 760P/E Valve Positioners

Ordering data

Model Number

Series 760 Valve Controller/Positioner

Basic Model Code No.

• 760 Valve Controller (Positioner)

Order No.

760 ■■■ ■ ■■■■■■ (cont. on page 3.5)

Input signal	
• 4 to 20 mAdc (not available with High Temp. Option)	**E1**
• 3 to 15 psig	**P1**
• 3-27/6-30 psig	**P2**
• 20 to 100 kPa	**P4**
• 0.2 to 1.0 Bar	**P5**
• 0.2 to 1.0 kg/cm^2	**P6**
Action (Rising Stem/Linear or Rotary)	
• 1/2 to 4 inch stroke lever with set of (3) 60° cams	**1**
• 2 to 6 inch stroke lever with set of (3) 60° cams	**2**
• 1/4 turn - 1/2 inch square shaft with set of (3) 90° cams	**3**
• 1/2 to 2 inch stroke lever with set of (3) 60° cams	**4**
• 1/4 turn NAMUR style shaft end with set of (3) 90° cams	**5**
• 1/4 turn - 1/2 inch square shaft with set of (3) 60° cams	**7**
• 1/2 to 4 inch stroke lever with (1) 90° linear cam	**E**
• 2 to 6 inch stroke lever with (1) 90° linear cam	**F**
• 1/4 turn NAMUR shaft with set of (3) 60° cams	**S**
Enclosure Type 4X/IP65 (with 3/4 inch NPT Conduit Connection)	
• Standard	**A**
• With 90° Beacon Indicator (not available with High Temp. Option)	**B**
• With 60° Flat Indicator (not available with High Temp. Option)	**J**
• With 90° Flat Indicator (not available with High Temp. Option)	**K**
Enclosure Type 4X/IP65 (with M25 Conduit Connection)*	
• Standard	**E**
• With 90° Beacon Indicator (not available with High Temp. Option)	**F**
• With 60° Flat Indicator (not available with High Temp. Option)	**N**
• With 90° Flat Indicator (not available with High Temp. Option)	**P**
Flow Capacity	
• Standard Capacity Spool Valve Assembly (Cv = 0.3)	**A**
• High Flow Capacity Spool Valve Assembly (Cv = 0.6)	**B**
• Low Flow Gain Spool Valve Assembly	**C**

NOTES:

1. Fix feedback pin in lever to hold non-linearity error to 3% max. Consult factory for more details.
2. The Low Flow Gain Spool Valve Assembly option can provide more stable operation when the positioner is installed on small volume actuators, i.e. piston diameters less than 4"" (10mm). Consult factory for more details.

*760 with M25 metric enclosure no longer avaialable. For M25 thread requirements, use adapter TGX:16300-1439

Ordering data

Model Number

Order No.

Series 760 Valve Controller/Positioner (cont'd)

Environmental Construction Options
- Standard Temperature (-40°F to +185°F) (-40°C to +85°C)
- High Temp. (-20°F to +300°F)(-29°C to +149°C) avail. on 760P w/ no elec. options or approvals
- Ozone Resistant with Viton® dynamic elastomers and iso-elastomeric spring

Gauges (Not available with Hi Temp. Environmental Construction "C"
- Not Required
- Gauges (set of three gauges)

Limit Switches (Not avail. with Hi Temp Environmental Construction "C"
- Not Required
- Mechanical Switches, (2) SPDT
- Proximity Switches (2) NAMUR type

Feedback Devices (Not avail. with Hi Temp Environmental Construction "C")
- Not Required
- Potentiometer - 1K
- 4 to 20 mAdc Feedback
- Potentiometer - 1K w/SS feedback gear
- 4 to 20 mAdc Feedback w/SS feedback gear

Design Level
- Revision

Electrical Approval
- None
- FM / CSA / ATEX / CE

760 (see page 3.4) — A C E | N G | N 1 2 | N 1 2 3 4 | D | N 6

Series 760 Approvals & Certifications

FM (Factory Mutual) Approvals:
- Intrinsically Safe:
  - Class I, Division 1, Groups A, B, C, D;
  - Class II, Division 1, Groups E, F, G;
  - Class III, Division 1;
- Non-Incendive:
  - Class I, Division 2, Groups A, B, C, D
- Suitable for:
  - Class II, Division 2, Groups E, F, G
  - Class III, Division 2

CSA (Canadian Standards Association) Certification
- Intrinsically Safe:
  - Class I, Division 1, Groups A, B, C, D;
  - Class II, Division 1, Groups E, F, G;
  - Class III, Division 1;
- Suitable for:
  - Class I, Division 2, Groups A, B, C, D;
  - Class II, Division 2, Groups E, F, G
  - Class III, Division 2

NOTES:
1. Fix feedback pin in lever to hold non-linearity error to 3% max. Consult factory for more details.
2. The Low Flow Gain Spool Valve Assembly option can provide more stable operation when the positioner is installed on small volume actuators, i.e. piston diameters less than 4"(10mm). Consult factory for more details.

Ordering data

760 Series Valve Controller/Positioner (cont'd)	Order No.
Conversions	
• Add I/P Module Kit (Converts 760P to 760E)	**16300-1355**
• 3-15 PSI Input Spring (Std. Temp.)	**16300-331**
• (3) Pressure Gauge Kit	**16300-442**
• Add 90° Beacon Indicator Kit (for 1/4 Turn Actuators)	**16300-488**
• Add 60° Flat Indicator Kit (for Lever Action Actuators)	**16300-486**
• Add 90° Flat Indicator Kit (for 1/4 Turn Actuators)	**16300-487**
• 3-15 PSI Conversion Kit (Hi Temp)	**16300-640**
• 3-27/6-30 psi Conversion Kit (Std. Temp)	**16300-771**
• Hi-temps 3/27 PSI	**16300-772**
Options	
• Add Mechanical Limit Switches Kit (2) SPDT	**16300-500**
• Add Proximity Limit Switches Kit (2) NAMUR type	**16300-501**
• Add 1K Feedback Potentiometer Kit	**16300-503**
• Add 4 to 20 mAdc Feedback Kit	**16300-502**
• Add Mechanical Limit Switches & 1K Feedback Potentiometer Kit	**16300-505**
• Add Mechanical Limit Switches & 4 to 20 mAdc Feedback Kit	**16300-504**
• Add Proximity Limit Switches & 1K Feedback Potentiometer Kit	**16300-507**
• Add Proximity Limit Switches & 4 to 20 mAdc Feedback Kit	**16300-506**
• Add 1K Feedback Potentiometer Kit w/SS feedback gear	**16300-580**
• Add 4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-577**
• Add Mechanical Limit Switches & 1K Feedback Potentiometer Kit w/SS feedback gear	**16300-581**
• Add Mechanical Limit Switches & 4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-578**
• Add Proximity Limit Switches & 1K Feedback Potentiometer Kit w/SS feedback gear	**16300-582**
• Add Proximity Limit Switches & 4 to 20 mAdc Feedback Kit w/SS feedback gear	**16300-579**
Note: Above listed options are limited to standard upper temperature limit of +185° F.	
• Standard Flow Spool Valve Kit	**16300-468**
• High Flow Spool Valve Kit	**16300-469**
• Low Gain Spool Valve Kit	**16300-470**
• Sealing Plate Kit (converts 760E to 760P)	**16300-641**
Cams	
• 760 P/E Cam Kit, rotary 90° Action (3 cams: Linear, QO, =%)	**16300-783**
• 760 P/E Cam Kit, linear 60° Action (3 cams: Linear, QO, =%)	**16300-784**
• 75° Rectilinear-Linear	**16300-805**
• Cam, 180° - CW, Rotary -Linear	**16300-807**
• Cam, 30° - Rectelinear - Linea	**16300-816**
• Blank Cam Kit	**16300-267**
• Cam, 180° - CCW, Rotary-Linear	**A6X30005613**
Spare Parts Kits	
• Spare Parts Kit includes all recommended rebuild parts as shown in SD760, Issue 7	**16300-686**
Accessories	
• Manual	**SD760**
• User Manual CD (included with each instrument)	

Introduction

Features & Benefits

- Single-axis, force-balance principle of operation, ensures accurate and stable positioning
- Feedback circuits direct the actuator's position, ensuring adherence to the control instrument signal
- Range spring capability accommodates a wide variety of valve strokes and instrument spans

Description

The Series 73 Built-In Valve Positioners use the full force of the air supply to drive and maintain the piston or diaphragm in a pneumatic actuator to position a valve to what is required by a control instrument, regardless of the presence of forces that change valve position.

This line of compact instruments incorporates a single-axis force-balance principle of operation to ensure accurate and stable control valve positioning. In all cases, including bottom-loading applications, a Model 73 Built-In Valve Positioner is mounted directly on the topwork of the valve with no external levers or other exposed mechanisms.

Each positioner receives a signal from a control instrument, and using an air supply as high as 100 psig, the positioner strokes the valve actuator to the required position.

Like all valve positioners, the Model 73 Built-In Valve Positioners have feedback circuits designed to measure the position of the actuator's piston or diaphragm. The positioner then supplies or exhausts air to bring the actuator within the required range for its corresponding control instrument.

The position of the piston or diaphragm in the valve actuator is sensed by the amount of compressive force exerted by a range spring or the valve positioner's diaphragm assembly. By selecting the appropriate range spring from the wide selection available, almost any combination of valve stroke (from 1/4" to 4") and instrument span (from 2 to 24 psi) can be obtained.

Specifications

Functional Specifications

Input Range

3-15, 3-9, 9-15, 6-30, 3-27 psig

Valve Travel

Minimum: 1/4"
Maximum: 4"

Supply Pressure

Minimum: 3 psi above required actuator pressure
Maximum: 100 psig

Air Consumption

(in balance condition with 20 psig supply and 9 psig deadended output)

- 73N_F: 0.25 scfm
- 73N_B: 0.6 scfm

Overrange Limit

150 psig to any connection

Response Level

(output sensitivity to input pressure changes)

- 73N_F: 0.1% of input span
- 73N_B: 0.25% of input span

Functional: Mechanical

Materials of Construction

Aluminum, brass, stainless steel, Neoprene®, and/or Buna-N

Model Selection

Model	Type of Application
73N12F	Top-loading, direct-acting, input spans of 2 to 12 psi
73N24F	Top-loading, direct-acting, input spans over 12 to 24 psi
73N-FR	Top-loading, reverse-acting
73N-B	Bottom-loading, direct-acting, with top air cushion loading
73N-B1	Bottom-loading actuators w/actuator range spring

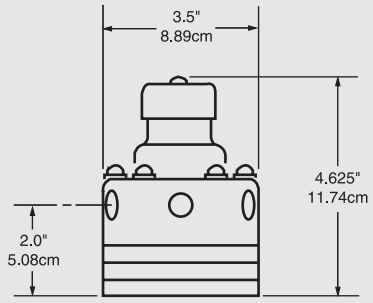
Technical data

Spring Table

Instrument Input Pressure Span (PSI)									
	4	5	6	8	10	12	16	20	24
Valve Stroke Inches	**- Item No. of Range Spring Series 12395 Series ±5% Stroke Range Tolerance Example: 12395-1212**								
1/4	1212	1012	812	612	512	412			
5/16	1612	1212	1012	712	612	512			
3/8	1812	1412	1212	1012	712	612			
7/16	2012	1812	1412	1012	812	712			
1/2	2412	2012	1612	1212	1012	812			
9/16	2812	2012	1812	1412	1012	1012			
5/8	3212	2412	2012	1612	1212	1012			
3/4	3612	2812	2412	1812	1412	1212			
7/8	4412	3612	2812	2012	1812	1412			
1	4812	4012	3212	2412	2012	1612			
1-1/8	5612	4412	3612	2812	2012	1812			
1-1/4	6412	4812	4012	3212	2412	2012			
1-1/2		6412*	4812	3612	2812	2412			
1-5/8		6412*	4812	4012	3212	2612			
1-3/4		6412*	5612	4412	3612	2812			
2			6412*	4812	4012	3212			
2-1/4				5612	4412	3612			
2-1/2				6412*	4812	4012			
2-3/4				6412*	4812	4412			
3					6412*	4812			
3-1/2						5612	***Consult Factory***		
4						6412*			

1) The maximum zero pressure for Model 73N12F is 9 psig when the 12395 series range spring is used.
2) The maximum zero pressure for Model 73N24F is 15 psig for instrument pressure spans of 16 psi or greater, and 28 psig when used for spans of 12 psi or less.
3) The maximum instrument pressure for Model 73N-FR is 15 psig for instrument pressure spans of 12 psi or less, and 27 psi for spans of 16 psi or greater.

Mounting Dimensions



The topworks of the valve must have six, 1/4-20 x 9/16 deep (min.) blind tapped, equally spaced holes for mounting positioner

Spring Selection

1. Find the valve stroke nearest the desired valve stroke.
2. Find the instrument input pressure span nearest the desired instrument input pressure span.
3. Select the proper range spring at the intersection of the valve stroke and the instrument input pressure span columns.

Introduction

Features & Benefits

- Double-acting or single-acting service accommodates installation in a variety of environments
- Field reversibility reduces downtime and simplifies maintenance
- Choice of continuously adjustable standard stroke ranging from 1/4" to 48" and continuous span and zero adjustability within range spring limits provide application versatility
- Extra high capacity pilots ensure maximum frequency response and optimum stroking speeds for all actuator sizes
- Negative feedback pilot circuit allows the positioner to operate with a push-pull gain of more than 900:1 (using 100 psig supply) with no sacrifice in stability

Description

The Model Series 74 Valve Positioners are universal positioners that provide versatility, dynamic performance, and high positioning accuracy. They use the piston or diaphragm in a pneumatic actuator to position a valve to what is required by a control instrument and hold that position, regardless of the presence of forces that change valve position. As such, supply pressure variations have little or no effect on the positioner output, which eliminates the need for a supply pressure regulator.

These valve positioners are two-stage, pilot-operated instruments. The pilot circuit activates dual-output boosters, which perform opposite actions (when one booster is supplying air, the other is exhausting air.) This “push-pull” action applies to a full differential (supply pressure to atmosphere) across the actuator to drive the valve to the position required by the control instrument signal.

Model 74 Valve Positioners can also be used for single-acting service on a spring-loaded actuator. In this case, one of the pilot-booster connections is plugged. See below for rotary-type actuators.

Specifications

Input Ranges

3-15, 3-9, 3-27, 0-15, and 0-30 psig including split ranges within these basic ranges

Valve-Stroke Ranges[1]

1/4" minimum
48" maximum

Supply Pressure

3 psig above full actuator pressure minimum
150 psig maximum

Air Consumption

0.2 scfm (inbalanced condition with 20 psig supply)

Overload Protection

150 psig at any connection

Response Level

Output is sensitive to control signal changes as small as 0.1% of full range

Ambient Temperature Range

-40 to 180°F (-40 to 82°C)

Materials of Construction

Aluminum, brass, stainless steel, and Buna-N

Rotary Actuators Kit

The Series 74 Rotary Actuator Kits allows for compact installation of a complete assembly (positioner and mounting) to fit inside a 5"x 5"x2-2/3" envelope. The kit’s direct connected feedback spring eliminates error-prone connections and levers, while its spiral feedback spring provides inherent reliability.

Response Level

0.1% F.S.

Linearity

±1.5% F.S.

Input Range

3-9, 9-15[2], 3-15 psig

Actuator Motion

90° Rotation

1) See next page for additional performance data, design specifications, and a range spring selection chart.
2) 9-15 psig range requires a suppression spring.

Ordering data

Model Number — Order No.

Valve Positioner

Sensitivity

Standard Pilot & Standard Gain

• Stabilizing Pilot & Reduced Gain

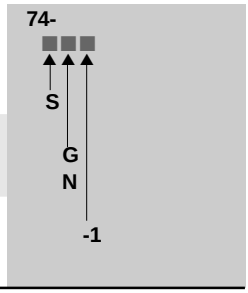
Gauge Option

• With 3 Gauges

• Without Gauges

Intermediate Sensitivity

• Standard Pilot & Reduced Gain (74S only)



Accessories

- Rectilinear Range Spring Kits - Rectilinear range spring kits include a range spring, zero screw, (2) range spring seats, and instructions. All kits include the (2) range spring seats, P/N 12372-384 (not listed below).
- Rotary Range Spring Kits - The table below lists the kit numbers, spring assembly numbers, and their color codes.
- Zero Suppression Spring Kits - Zero suppression spring kits include a suppression spring and a spring seat. All kits include the P/N 12372-254 spring seat (not listed below).

3

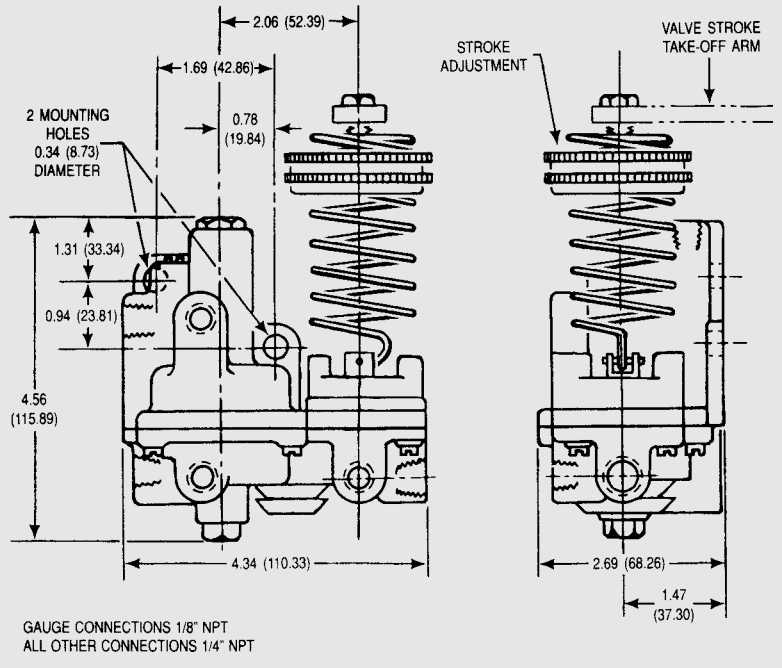
Range Spring Kit Table

Acutator Stroke - Inches -	Kit and Parts	Instrument Input Pressure Range - psig				
		3-15	3-9	3-27	0-30	0-15
1/4 to 1-1/2	Kit No. Spring No. Color Code Screw No.	14995-101 14996-1 Black 12372-274				
1-1/2 to 2-3/4	Kit No. Spring No. Color Code Screw No.	14995-102 14996-2 White 12372-273		***Consult Factory***		
2-3/4 to 4	Kit No. Spring No. Color Code Screw No.	14995-103 14996-3 Blue 12372-273				
4 to 6	Kit No. Spring No. Color Code Screw No.	14995-119 14996-102 Brown 12372-292		N/A		
6 to 9	Kit No. Spring No. Color Code Screw No.	14995-117 14996-104 Green 12372-292			N/A	
9 to 12	Kit No. Spring No. Color Code Screw No.	14995-120 14996-106 Red 12372-3034	***Consult Factory***		N/A	
12 to 19	Kit No. Spring No. Color Code Screw No.	14995-118 14996-110 Orange 12372-303		N/A		
48	Kit No. Spring No. Color Code Screw No.	14995-121 14996-111 None 12372-296		N/A		

Rotary Range Spring Kit

	Rotation of Actuator Shaft	Clockwise		Counterclockwise	
	Instrument Input Range -psig-	3-9	3-15	3-9	3-15
Kit Supplied Without Mounting Plate	Kit No. Spring No. Color Code	Consult Factory	14923-154 14923-70 White	Consult Factory	14923-104 14923-71 Red
Kit Supplied With Mounting Plate	Kit No. Spring No. Color Code	Consult Factory	14923-154 14923-70 White	Consult Factory	14923-103 14923-71 Red

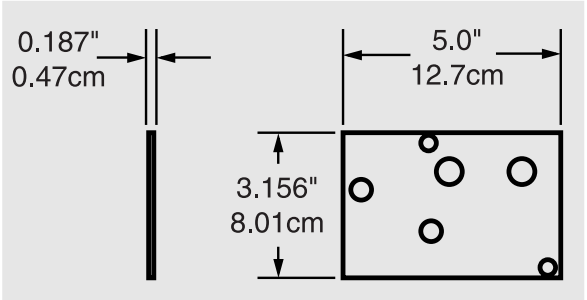
Mounting Dimensions



Mounting Dimensions, Rotary Kit

The actuator extension shaft must be 0.3125" ±0.0010" and capable of withstanding 100 inch-pounds of torque (pinned assembly recommended).

Installer to drill and mount the base plate so that the appropriate feedback hole (clockwise or counter-clockwise rotation) is concentric with actuator extension shaft.



Transducers

Models 77 and 771 Current-to-Pneumatic Transducers

Introduction

Features & Benefits

- High signal sensitivity for demanding applications
- Simplified design ensures simplified operation
- Rugged, NEMA construction, with insensitivity to shock, vibration, and supply pressure variations accommodate operation in harsh industrial environments
- Choice of output capacities provides application versatility

3

Description

The Models 77 and 771 convert a DC milliampere input signal to a pneumatic output signal directly proportional to the input. Their rugged design and ability to withstand shock and vibration allow them to be installed in even the harshest industrial environments.

Model 77 Current-to-Pneumatic Transducer

The Model 77 Current-to-Pneumatic Transducer, which was designed specifically for measuring circuits, converts the output of an electronic measuring device to a pneumatic signal for indication, recording, computation, or control. It can also be used to convert an electronic controller's signal to operate a final control element, such as a control valve circuit that requires a high degree of accuracy.

The Model 77 is typically used to signal a valve positioner. If it is used for direct-loading of valve actuators or other large volumes, a volume booster relay is required to minimize time lags and the effects of leakage.

Model 771 Current-to-Pneumatic Transducers

The Model 771 Current-to-Pneumatic Transducers were designed as a cost-effective valve service current-to-pneumatic transducer.

The Model 771 receives the output signal of an electronic device, such as a PID control function, and drives a control valve via the transducer until the control function is satisfied. For measuring circuits, or for control circuits requiring a higher degree of transducing accuracy, the Model 77 should be used.

Because it's boosted output capacity minimizes time lags and the effects of leakage, the Model 771B should be used for direct loading of valve actuators or other large volumes. If the valve actuator includes a valve positioner, a Model 771S should be used.

Specifications – Model 77

Functional Specifications

Supply Pressure

20 psig, ±2 psig for 3-15 psig output
30 psig, ±2 psig for 3-27 psig output

Input/Output Data

See Model Selection

Model 77

For general purposes and non-hazardous applications

Model 77F

For intrinsically safe applications

Zero Offset Adjustment

+40% and −20% of span

Pneumatic Connections

1/4" NPT

Output Capacity

0.16 scfm

Supply Pressure Effect

Less than 1% of span (change of output for supply change from 18 to 22 psig)

Temperature Range

-40 to 180°F (-40 to 82°C)

Electrical Connections

Enclosed terminal block, 1/2" threaded

Surface Mounting

Two 1/4 x 20 x 5/16" deep blind tapped holes

Enclosure

NEMA 3R
NEMA 4 via conduit vent

Electrical Classification

FM Approved
Model 77
Non-incendive for Class I, Div. 2, Groups A, B, C, D. Dust-ignition proof for Class II, Div. 1, Groups E, F, G. Suitable for Class III, Div. 1 hazardous locations and NEMA 4.

Model 77XXF
Intrinsically safe for Class I/II/III, Div. 1, Groups A, B, C, D, E, F, G and NEMA 4 when used with approved barriers and converters listed on Siemens drawing #15032-7704/7705.

Performance Specifications

Calibration Accuracy

±0.25% of span

Reproducibility

0.2% of span

Response Level

0.025% of span

Model Number

Order No.

Current-to-Pneumatic Transducer

77- ■■■■ - ■

Exhaust
- Atmospheric
- Tapped Exhaust

Input/Output

Input Range[1] (mA dc)	Output Range (psig)	Input Impedence (Ohms)
1 to 5	3 to 15	2450
0 to 4	3 to 15	2450
4 to 20	3 to 27	610
4 to 20	3 to 15	185
10 to 50	3 to 15	30

Intrinsically-Safe Designation
- Intrinsically Safe (omit for other classifications)

Accessories
- Reverse Acting Output

- E
- 3
- 3A
- 8
- 16
- 40
- F
- R

Specifications – Series 771

Functional Specifications

Supply Pressure

20 psig (35 psig for 771-8_ _ _)

Input/Output Data

See Model Selection

Zero Offset Adjustment

+40% and –20% of span

Output Capacity

Standard: 0.16 scfm
Boosted: 2.0 scfm

Supply Pressure Effect

Less than 2% of span (change of output for supply change from 18 to 22 psig)

Temperature Range

-40 to 180°F (-40 to 82°C)

Electrical Connections

Enclosed terminal block, 1/2" threaded

Enclosed

NEMA 3R
NEMA 4 via conduit vent

Electrical Classification

FM Approved
Series 771_ _ _ F1: Intrinsically safe for Class I/II/III, Div. I, Groups A, B, C, D, E, F, G when used with approved barriers and converters listed on Siemens drawing #15032-7704/7705.

Series 771_ _ _ F2: Non-incendive for Class I, Div. 2, Groups, A, B, C, D. Dust-ignition proof for Class II, Div. 1, Groups E, F and G. Suitable for Class III, Div. 1 hazardous locations.

Performance Specifications

Calibration Accuracy

±1/2% of span standard unit
±1% of span boosted unit

Reproducibility

0.2% of span

Response Level

0.025% of span

1) Other input ranges available; 0 - 3 mA to 0-60 mA, consult factory.

Models 77 and 771 Current-to-Pneumatic Transducers

Ordering data

Model Number

Current-to-Pneumatic Transducer

Order No. 771- ■■■■

Input/Output

Input Range[1] (mA dc)	Output Range (psig)	Input Impedence (Ohms)	Order No.
1 to 5	3 to 15	2450	3
4 to 20	3 to 27	610	8
4 to 20	3 to 15	185	16
10 to 50	3 to 15	30	40

Output Capacity

	Order No.
• Boosted	B
• Standard	S

Terminal Strip — T

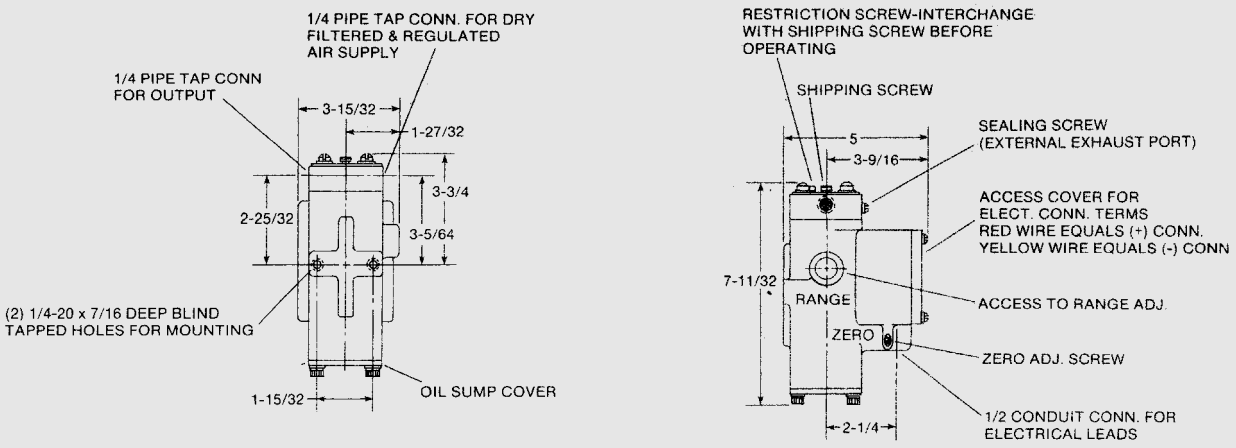
Electrical Approval

	Order No.
• None Required	N
• Intrinsically Safe	F1
• Non-incendive	F2

Accessories

- P/N 12330-100 - Wall Mount Bracket
- P/N 12334-130 - Pipe Mounting Bracket
- Reverse Acting (not available on the Model 771-8) Increase input; decrease output. Add "R" to model number.

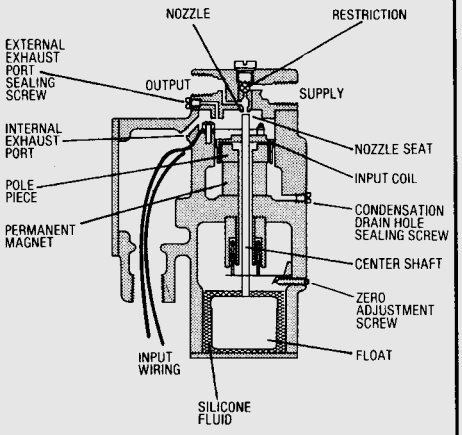
Mounting Dimensions – Model 77



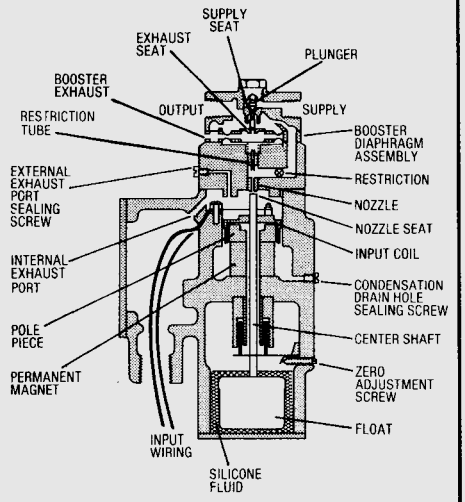
NOTES:

1. ALL CONNECTIONS ARE 1/4 NPT EXCEPT AS SHOWN.
2. MUST BE MOUNTED VERTICALLY (±10°) AS SHOWN.
3. FLAT ADAPTER PLATE (P/N 12330-100) AVAILABLE TO MOUNT TRANSDUCER ON A BLIND WALL.

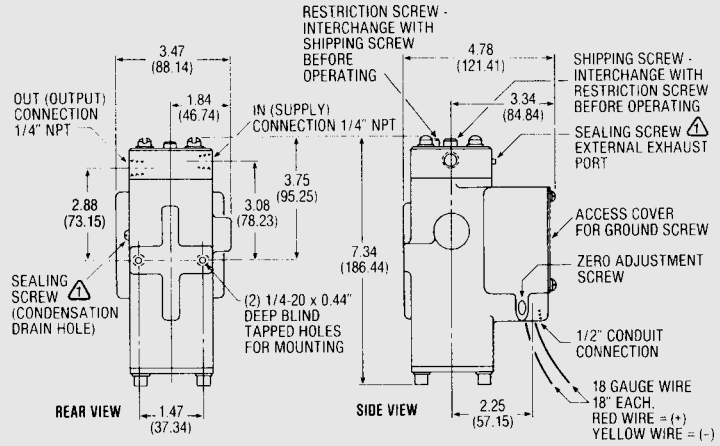
Mounting Dimensions – Model 771 S/B



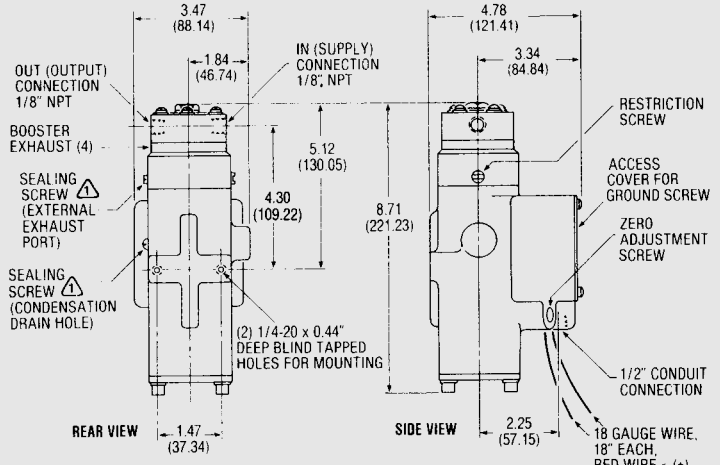
MODEL SERIES 771S
Standard Output Capacity



MODEL SERIES 771B
Boosted Output Capacity



MODEL SERIES 771S
Standard Output Capacity



MODEL SERIES 771B
Boosted Output Capacity

NOTES:

⚠1 Sealing screw must not be removed in a Class II hazardous location or under any NEMA 4 condition.

2. Dimensions are shown in inches and (millimeters).
3. Clearance of at least 5" (127MM) must be left above the top when mounting the transducer to permit removal of shipping and restriction screws and top cap (standard capacity models) and retaining nut (boosted models).
4. Transducer must be installed so that water cannot enter booster exhaust under NEMA 4 conditions (boosted models).
5. Transducer must be installed within 10° of vertical.

Models 40, 41, and 42 Precision Pressure Regulators

Features & Benefits

- Multi-stage, low-droop precision regulators maintain constant output over wide changes in flow and supply pressure
- Epoxy powder coat paint delivers improved corrosion resistance
- Wide selection of regulated pressures (1" to 450 psi) affords application versatility
- Patented Nullmatic pressure regulation system provides reliable maintenance-free operation

Description

The Models 40, 41, and 42 Precision Pressure Regulators control air pressures in applications where precise and dependable regulation is required, such as pneumatic instrument circuits, test stands, production checking fixtures, and industrial air gages. As such, they are suitable for dead-end service, and flows up to a maximum of 110 scfm.

A unique, two-stage piloted design provides outstanding accuracy. Rugged construction—with no links, levers, pivots, or other friction-producing members—ensures reliable, maintenance-free operation. These features allow a regulator to maintain constant output pressure, regardless of even the widest changes in flow or supply pressures. In fact, a regulator using a Model 40, 41, or 42 is practically a self-contained pressure controller operating its supply-plunger valve via a built-in, high-gain pneumatic amplifier.

A fine-turn, precision screw is used to manually load the range spring, which sets the regulated pressure. When the adjusting knob is turned clockwise, the increased spring force is exerted on the top diaphragm assembly, decreasing the nozzle clearance and increasing the pilot pressure. Because the source for pilot pressure is supply air flowing to the pilot pressure chamber through the restriction screw, the increased pilot pressure forces the exhaust diaphragm assembly downward. This action closes the exhaust port, and contacts and moves the valve plunger, which opens the supply port. This increases the regulated output, which also feeds back to the top diaphragm assembly. The regulator locks-up or throttles at the new output value when the feedback force of the top diaphragm assembly equals the range spring force.

A safety release valve is incorporated in the top diaphragm assembly of several models. It operates if the regulated pressure increases 3 psig more than the set pressure and exhausts air through the atmospheric vent in the top housing. Overpressure causes the diaphragm to move upward, which opens the safety release valve.

Specifications

Resolution Adjustment

Better than 0.03% of regulated output

Supply Pressure

Maximum & recommended pressures are listed on page 4.5
Minimum: 5 psig above regulated output

Supply Pressure Effect

Nominal ratio of change in regulated pressure for a change in supply
1:150 for Model 40 and 42
1:100 for Model 41

Ambient Temperature Limits

-40 to 180°F (-40 to 80°C)

Ambient Temperature Effect

Approximately 1% of set pressure with standard range spring, for 50°F (27.8C) temperature change

Knob Adjustment

Model 40 & 42: Nominal 10% of full range for one complete turn
Model 41: Nominal 15% of full range for one complete turn

Droop Effect

See Graph 1

Maximum Air Flow

See Graph 2

Models 40, 41, and 42 Precision Pressure Regulators

Technical data

Air Consumption

See Graph 3

Drift Effect

See Graph 4

Exhaust-Flow Rate (at 25-psig setting)

Pressure rise of 0.25 psig will result from flow of:
Model 40: 1.5 scfm
Model 41: 2.4 scfm
Model 42: 1.7 scfm

Maximum Flow Capacity

See Graph on page 4.4

Standard Mounting

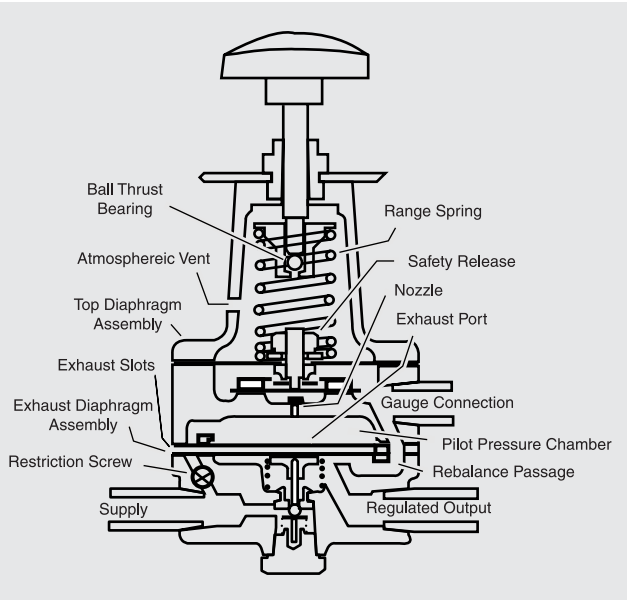
In-line pipe or flush panel up to 1/4" thick (bushing for 3/4" thick panel is optional)
Connections: (supply and outlet)
Model 40: 1/4" NPT
Model 41: 1/8" NPT
Model 42: 1/2" NPT

Materials of Construction (materials in contact with regulated media)

Brass, stainless steel, Neoprene, aluminum, and zinc

Accessories

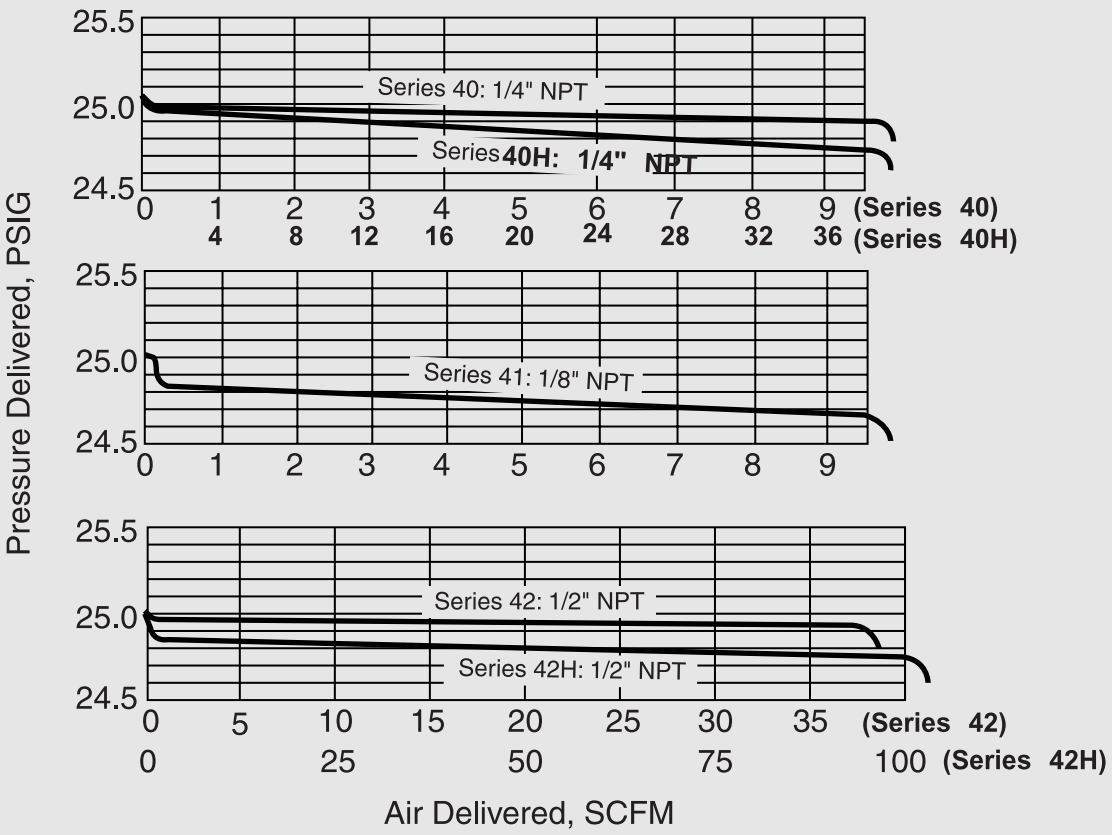
- P/N 2932-19 - Mounting Bracket for surface mounting (Model 40 and Model 42)
- P/N 10963-73 - Mounting Bracket for surface mounting (Model 41)
- P/N 3603-22 - Locknut



Options

- **Air Loading**
  Provision for supplementary air loading (100 psig max) in addition to spring loading
  Model 42: 1/4" NPT
  Model 41: 1/8" NPT
  Model 40-2: Not available
  Add [A] into the model number.
  Example: 40A15
- **Tapped Exhaust**
  Provision for piping exhaust flow away from the regulator
  Model 42: 1/8" NPT
  Model 40 & 41: Not available
  Add [E] into the model number.
  Example: 42E15
- **Deletion of Safety release Valve (SRV)**
  The SRV increases exhaust flow capacity when the regulator must exhaust large flows. Deletion of the SRV will improve drift characteristics (see Graph 4). The SRV is not available with the Seimens 41. It is standard with:
  Model 40: 2, 7, 15, 30, 50 & H50 pressure ranges
  Model 42: 15, 30, 50, H30, & H50 pressure ranges
  To delete the SRV, add an [X] into the model number.
  Example: 40X15

Graph 1 Droop Effect

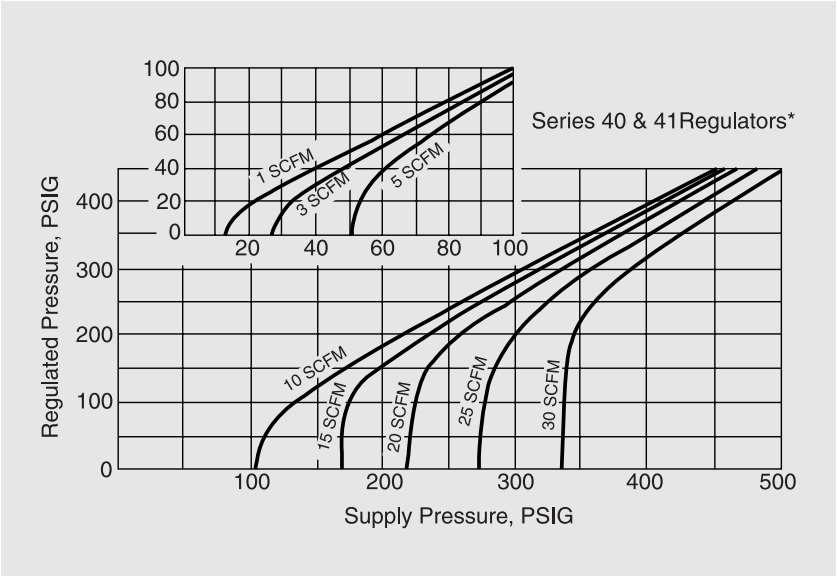


Test Procedure: Each 30-psig-range regulator was adjusted to 25 psig with 100 psig supply and no flow. Flow was increased to maximum capacity. All regulated pressure readings were taken at gauge connection in the body of the regulator.

Models 40, 41, and 42 Precision Pressure Regulators

Technical data

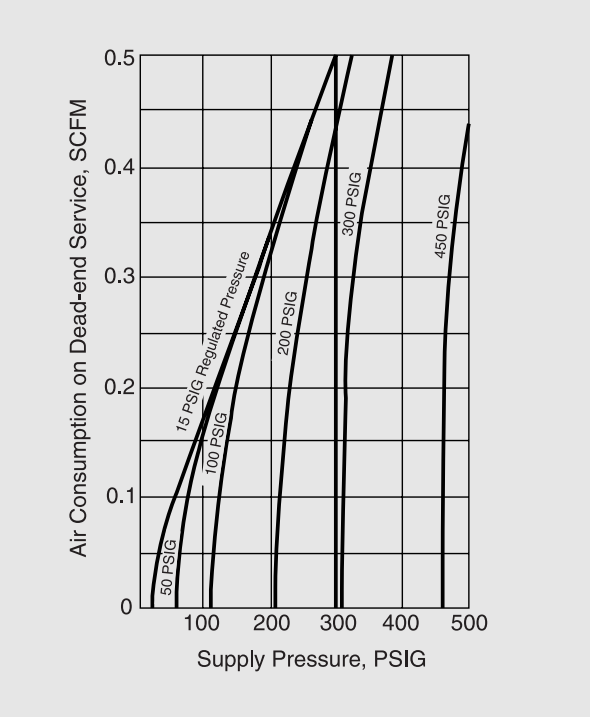
Graph 2 Maximum Air Flow, SCFM Delivered



** Supply pressure for other models will be determined by multiplying the pressure(s) above by the flow values shown below:*

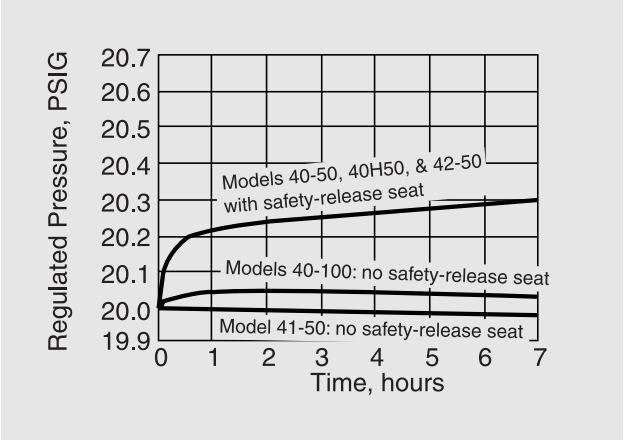
Model	Value
Model 40H	4.5
Model 42	4
Model 42H	14

Graph 3 Air Consumption



The Nullmatic regulator bleeds only the amount of air that passes through the pilot nozzle when there is no demand for output flow. The exhaust port starts to close as soon as the flow of regulated air is increased to the output, and it closes completely before the pilot-plunger valve opens. Full pilot flow is then delivered to the output.

Graph 4 Drift Effect



Test Procedure: Regulators were set at 20 psig output with 100 psig air supply. Supply was turned off for one week, after which supply was turned on at time 0.

Model Selection

		Supply Pressure psig				
Model No.	**Range psig[3]**	**Recommended**	**Maximum**			**Standard Modifications**
40-2[1]	(1-50"H_2O)	5-10	25			X
40-7	(6-200"H_2O)	50	100			A & X
40-15	0.5-15	75	150			A & X
40-30	1-30	120	150			A & X
40-50	1-50	120	150			H, A & X
40-100	1.5-100	150	500			H & A
40-200	3-200	250	500			A
40-300	7-300	350	500			A
40-450	15-450	500	500			A
41-15	0.5-15	75	150			A
41N15[2]	0.5-15	75	150			
41-30	1-30	120	150			A
41-50	1-50	120	150			A
41-100	1.5-100	150	250			A
41-2550	25-50	120	150			
42-15	0.5-15	75	150			A, E & X
42-30	1-30	120	150			H, A, E & X
42-50	1-50	120	150			H, A, E & X
42-100	1.5-100	150	500			H, A & E
42-200	3-200	250	500			A & E

Standard Modifications
H - High flow capacity.
A - With pressure-tight top housing, containing 1/4" NPT connection for supplementary air loading.
E - With 1/8" NPT connection to collect exhaust
X - Without safety release.

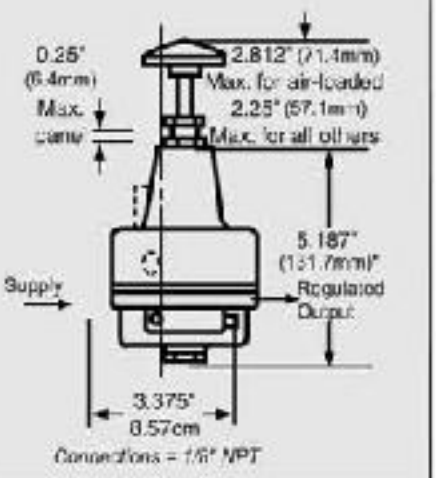
1) Includes locknut on adjusting stem (optional for all other models).
2) For use with Model 65 Square-Root Extractor to maintain minimum 3 psig output.
3) At recommended supply pressure.

Models 40, 41, and 42 Precision Pressure Regulators

Dimensional drawings

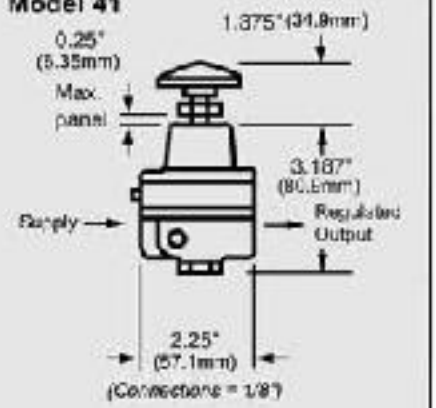
Mounting Dimensions

Model 40



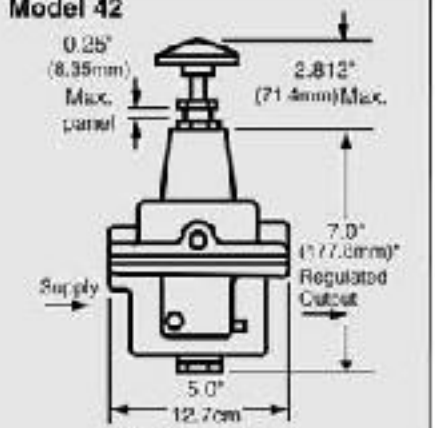
Connections = 1/8" NPT

Model 41



(Connections = 1/8")

Model 42



*Add 0.125" 0.31cm
for 200 psig Models
(Connections = 1/2" NPT)

Model 91-HF Filter-Regulator

Features & Benefits

- Stable output and repeatability - provides constant control under variable flow rates and supply pressures.
- Corrosion resistant construction - aluminum die castings are finished with Iridite and baked epoxy paint.
- Depth filter -unit comes equipped with high capacity 3 micron filter housed in drip-well.
- Self-Relieving
- Low droop at high flow levels - aspirator design helps maintain set pressure at higher flow levels.

Tight shut-off - a soft, rubberized valve provides a positive shut-off and compensates for dirt and other foreign matter.

Description

The Model 91-HF Filter-Regulator is designed to provide clean, accurate air pressure to valve positioners, and other pneumatic control equipment. The filter regulator has been proven to provide long lasting service and maintenance in harsh industrial environments. The model 91-HF filter regulator is a quality unit that is ideal as an economical alternative for control of process applications.

The Model 91-HF is used extensively to supply air to pneumatic controllers, transmitters, transducers, valve positioners, air cylinders, and a wide range of pneumatic control systems.

Specifications

Performance Specifications

Output Range

0-120 psig (0-800 kPa)

Maximum Supply Pressure

150 psig (1034 kPa)

Flow Capacity

22 SCFM (37.0 m³/hr) at 100 psig (700 kPa)

Exhaust Capacity

0.1 SCFM (0.17 m³/hr) with downstream pressure 5 psig (35 kPa) above set point

Sensitivity

1" (2.5 cm) of water

Air Consumption

Less than 5 SCFM (0.17 m³/hr)

Effect of Supply Pressure Variation

Less than 0.2 psig (1.4 kPa) for 25 psi (170 kPa) change

Ambient Temperature Limits

0 to 160°F (-18 to 71°C)

Mechanical Specifications

Mounting

Pipe or through body

Weight

1.6 lb (725 g)

Port Size

(In, Out, and Gauge) 1/4" NPT

Materials of Construction

Body: Die-cast aluminum alloy, Iridite and baked Epoxy finish

Filter: 3 micron Phenolic impregnated Cellulose

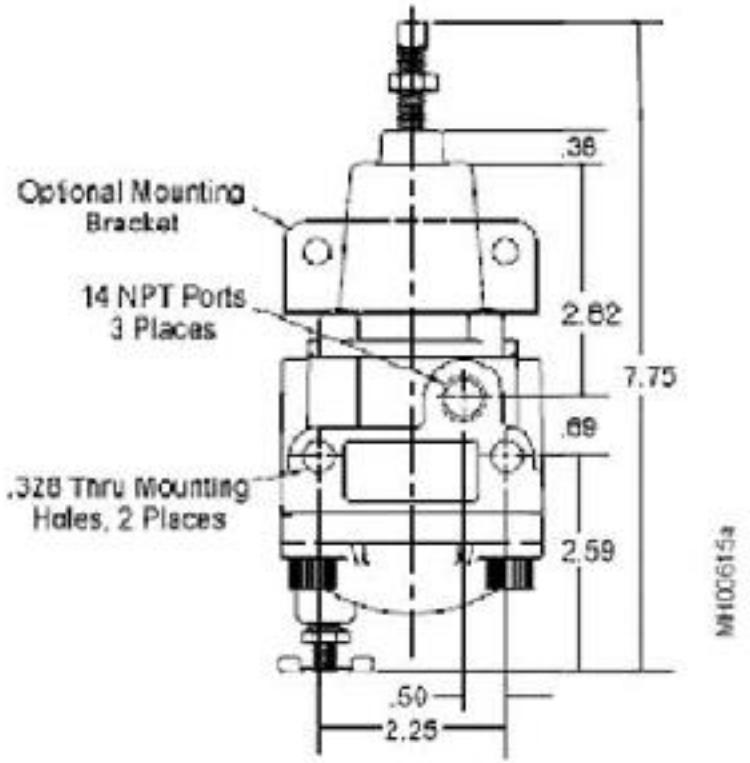
Diaphragm: Nitrile Elastomer and Nylon fabric

Valve Seat Plug: Nitrile Elastomer

Additional Materials: Brass, Zinc plated steel, Acetal

Introduction

Mounting Dimensions



Model 2306 Instrument Air Filter

Introduction

Features & Benefits

- Solid brass construction delivers exceptional durability
- Natural wool filter medium provides unsurpassed coalescing action

Description

The Model 2306 instrument air filter is used to remove dirt, oil, water, and other impurities from an instrument-air supply. This highly efficient instrument-air filter uses the principle of coalescence to trap fine particles in a dripwell.

Air enters the filter through the inlet connected to a cylindrical filter cartridge. After the air is filtered as it passes through the cartridge, it flows up between the cartridge and the outer housing.

As the air flows downward through the lamb's wool filtering medium, oil and water particles coalesce. The steady blow down action of the incoming air maintains high filtering efficiency by cleaning the filter cartridge continuously, while the natural force of gravity forces the coalesced materials to collect at the bottom of the dripwell.

A simple petcock permits the filter to be blown down periodically.

If accumulated dirt and scale make it necessary to replace the filter cartridge, the replacement may be effected without disturbing inlet and outlet connections by turning the housing out of the cap.

Specifications

Functional Specifications

Recommended Flow for Optimum Efficiency

0.5 scfm at 75 psig (14 dm³/m at 530 kPa)

Maximum Supply Pressure

1000 psig (69 bar)

Performance Specifications

Pressure Droop Through Filter with 75 psig Supply

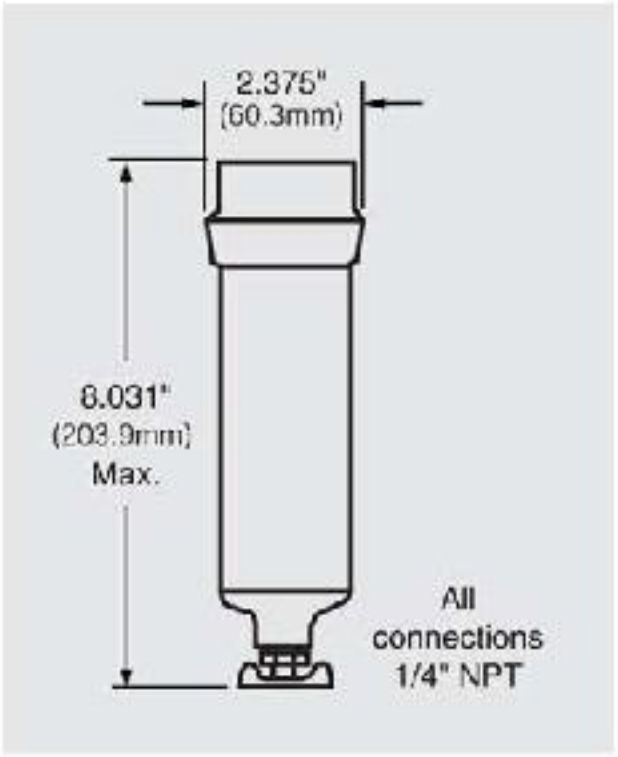
Pressure and 0.5 scfm flow approximately 1/4 psi (2 kPa)

Mechanical Specifications

Materials of Construction

Brass, aluminum, lamb's wool, and neoprene

Mounting Dimensions



1) Flow capacities at higher or lower supply pressures will vary in direct proportion to the absolute pressure.

Series 61 Booster Relays

Introduction

Features & Benefits

- Force-balance principle produces a proportional output for pneumatic circuit flexibility
- Built-in stability needle valve on the 61H and 61VH minimizes piping needs
- Improved valve stroking speed for better process control
- Epoxy powder coating provides improved corrosion resistance
- Accurate 1:1 signal relay provides pneumatic circuit design flexibility

Description

The Series 61 Booster Relays reproduce pneumatic signals in a 1:1 ratio for applications where input isolation or increased flow capacity are required. Various models are available to meet a wide range of requirements.

Valve Service

Model 61H High-Capacity Booster Relay

The Model 61H High-Capacity Booster Relay was designed to improve the stroking speed of large diaphragm valves. As such, it incorporates a stabilizing bypass needle valve between the input and output, eliminating the need for an externally piped bypass.

Model 61VH High-Capacity Booster Relay

The Model 61VH High-Capacity Booster Relay was designed for use on control valve actuators that require very fast stroking speeds. As such, it incorporates a stabilizing bypass needle valve between the input and output, eliminating the need for an externally piped bypass.

Pneumatic Control

Model 61L Moderate Accuracy Booster Relay

The Model 61L Moderate Accuracy Booster Relay combines moderate accuracy with a moderate capacity (approximately 4.5 scfm output at 8 psi). Like the Model 61H relay, this instrument is used primarily in straight forward valve-booster applications.

Model 61F High Accuracy Booster Relay

The Model 61F High Accuracy Booster Relay via the sensitive preformed diaphragms in this relay provides greater accuracy in 1:1 transmission. Its output capacity is about 1/4 that of the Model 61L. As such, it is suitable for use in measuring circuits.

Model 61H is shown

Model 61FE Booster Relay

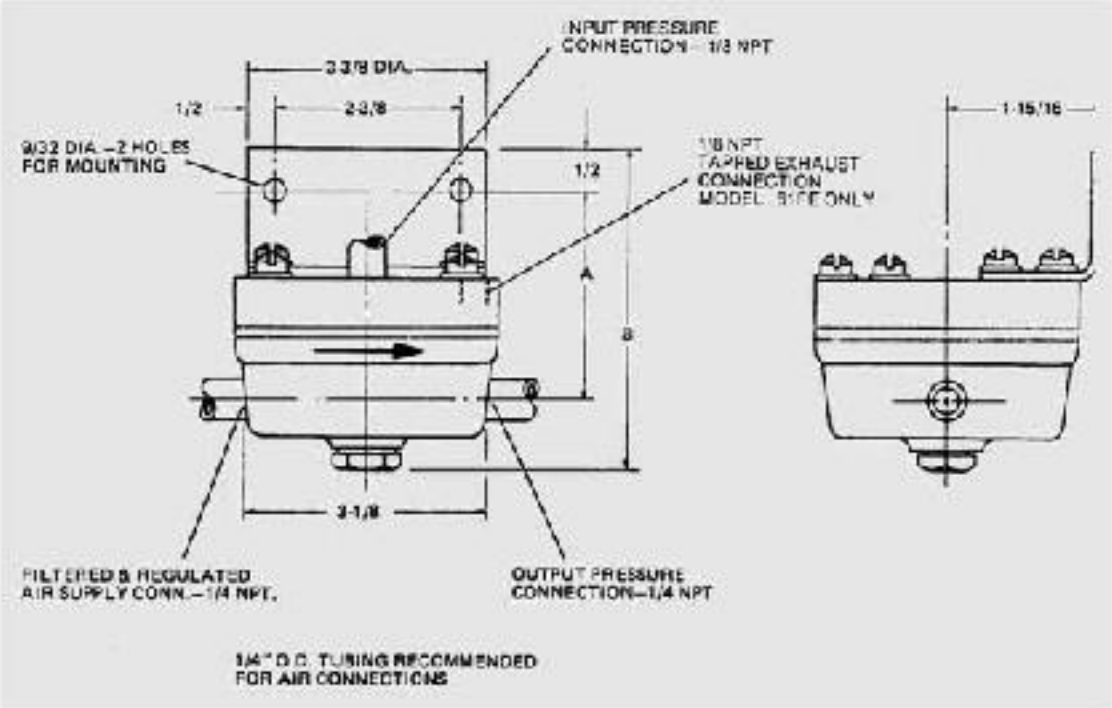
The Model 61FE Booster Relay is similar to the Model 61F; however, it also includes a 1/8" NPT connection for those applications where a ported exhaust is required.

Operation

Input pressure, acting upon the effective area of the upper diaphragm, produces a force that is opposed by the output pressure exerted upon the effective area of the lower diaphragm. The opposing forces are in a direct 1:1 ratio. As such, any increase in the input pressure will depress the diaphragm assembly and open the pilot valve to admit a sufficient supply of air to the output. This re-balances the input pressure. A decrease in input pressure will cause the diaphragm assembly to lift off the exhaust port, which reduces the output and re-balances the input.

Specifications

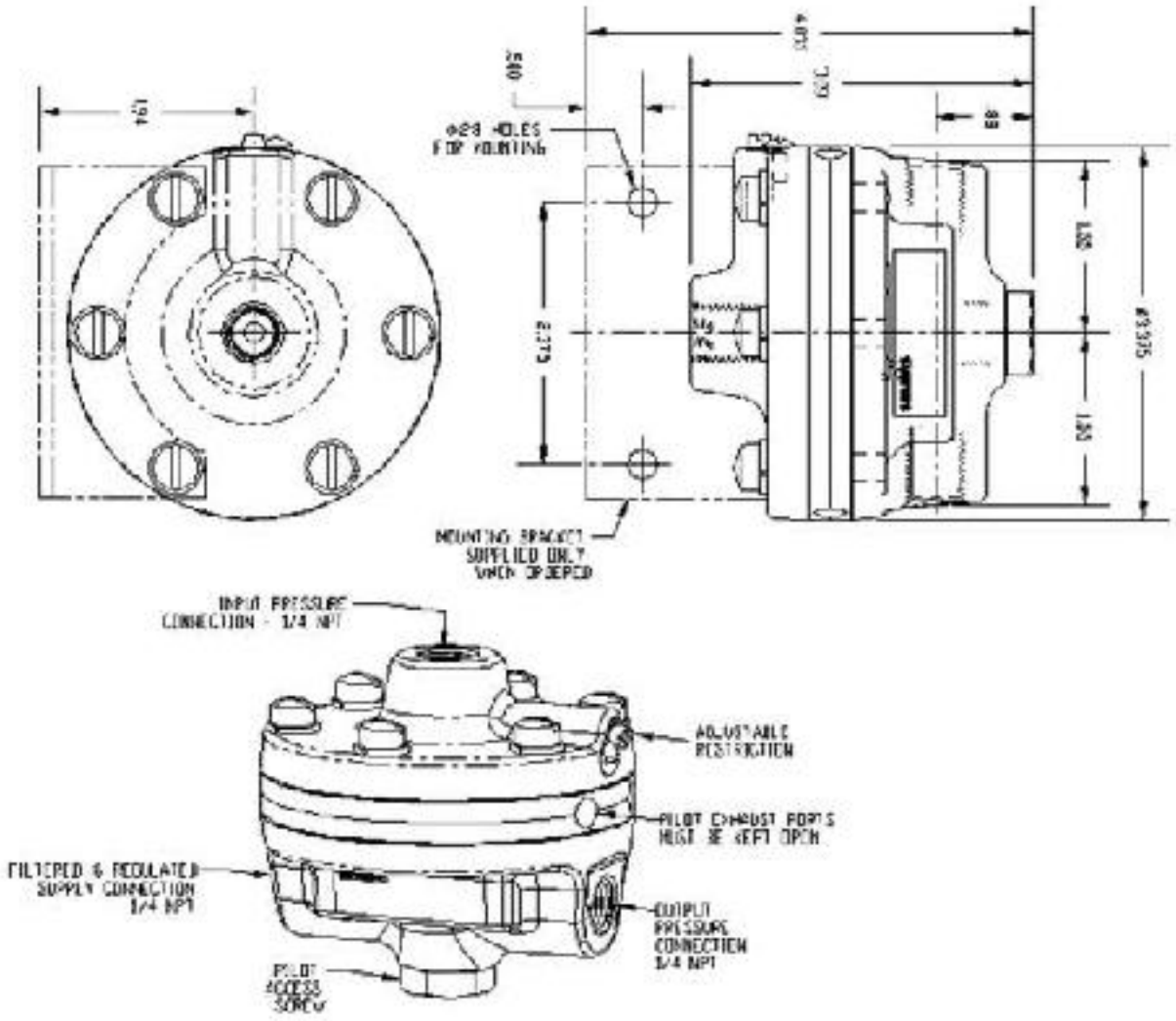
Model	61H	61L	61F & 61FE
Normal Input & Output Pressure	3-15	3-15	3-15
Maximum Input Pressure	100 psi	100 psi	50 psi
Maximum Supply Pressure	100 psi	100 psi	50 psi
Overload Protection to any Connection	100 psi	100 psi	100 psi
Accuracy of 1:1 Ratio	5%	2%	0.5%
Zero Error	-----	3%	1%
Reproducibility[1]	0.1%	0.1%	0.02%
Linearity[1]	0.4%	0.4%	0.1%
Ambient Temperature Limits		-40 to 150°F	
Flow Capacity[2]	10.5 scfm	4.5 scfm	2.4 scfm

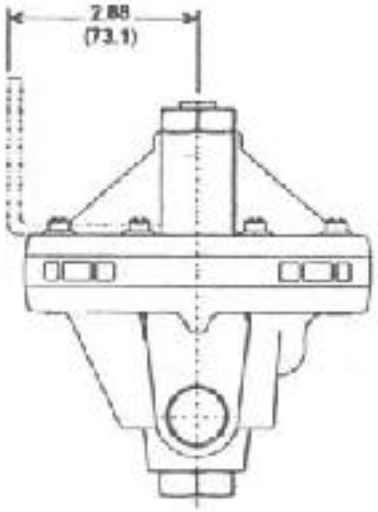


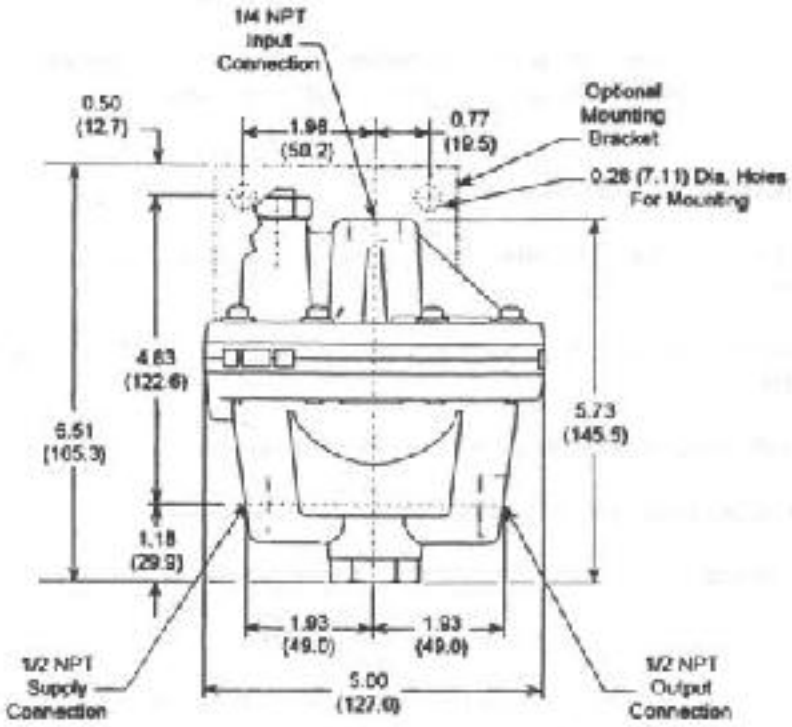
Model	A	B
61F, 61FE	2-13/16	4-3/16
61L	2-5/8	4

1) These performance figures are based on a 3-15 psi input.
2) Flow causes output pressure to creep 1 psi at 9 psi output with 20 psi supply.

Technical data




2.88
(73.1)


1/4 NPT
Input
Connection
0.50
(12.7)
1.98
(50.2)
0.77
(19.5)
Optional
Mounting
Bracket
0.28 (7.11) Dia. Holes
For Mounting
4.83
(122.6)
5.51
(165.3)
5.73
(145.5)
1.18
(29.9)
1.93
(49.0)
1.93
(49.0)
1/2 NPT
Supply
Connection
5.00
(127.0)
1/2 NPT
Output
Connection

Series 62 Constant-Differential Relays

Introduction

Features & Benefits

- The ability to maintain constant-differential pressure drop across a built-in needle valve ensures a constant volumetric flow rate
- Maintains constant bubbling rate in liquid level applications, eliminating the problems of typical conventional bubbling systems
- The ability to produce reasonable purge rates eliminates the need for a supply regulator
- Epoxy powder coating provides improved corrosion resistance

Description

The Series 62 Constant Differential Relays serve as air flow controllers maintaining a constant air purge for each setting of an integral needle valve.

By maintaining a constant-differential pressure drop across a built-in needle valve (for any flow setting up to 2.1 cu. ft. of air per hour), Series 62 Relays ensure a constant volumetric rate of flow, regardless of variations in process or supply pressure.

The constant-differential pressure across the built-in needle valve is regulated by a spring-loaded diaphragm. This diaphragm controls the action of the supply-port plunger, which automatically admits supply air to the needle valve at the required rate. Excess purge air bleeds to the atmosphere.

Siemens constant-differential relays eliminate most of the problems encountered in conventional bubbling systems, because:

- Each relay holds the bubbling rate constant, thereby maintaining high measurement accuracy
- The differential pressure maintained across the needle valve is approximately 1-1/2 psi, which allows wider needle valve openings that are less subject to clogging
- Full supply pressure (up to 150 psig) is connected to the purge system for a greater margin of safety
- Ordinary air-line impurities have no effect

In addition to the preceding advantages, the Series 62 Constant-Differential Relays ensure reasonable purge rates at all times, because they eliminate the need for a supply regulator. Another safety feature is the automatic exhaust, which bleeds off any excess air caused by the presence of foreign particles on the pilot seat of the supply-port plunger.

Specifications

Supply Pressure

Maximum: 150 psig
Minimum: 5 psi above highest output pressure required

Rotometer Pressure

Maximum: 200 psig (1380 kPa)

Supply Pressure Effect

0.18 scfh (max.) flow change for 25 psi increase of supply

Ambient Temperature Limits

-40 to 180°F (-40 to 82°C)
-40 to 160°F (-40 to 71°C) with Rotometer

Materials of Construction

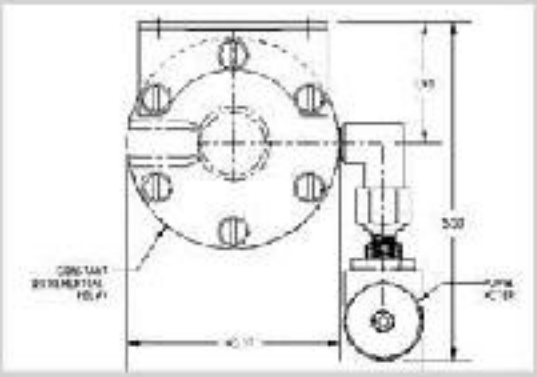
Relay: Aluminum, brass, stainless steel, Neoprene, Buna-N
Rotometer: Aluminum, Stainless steel, Borosilicate glass, Buna-N (O-rings), ruby sapphire (float), and brass (fittings)

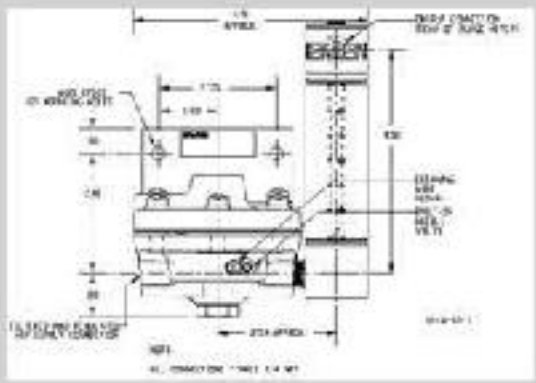
Ordering data

Model Number	Order No.
Constant-Differential Relay	62- ■■
Purge Rate	
• 0.03 to 2.1 scfh[1] Built-in needle valve has internal bypass to prevent tight shut-off of purge flow	V
• 0.06 to 1.8 scfh[1] Built-in needle valve provides tight shut-off of purge flow	VN
Flow Indicator[2]	
• Indicating Rotameter 0.25 to 2.5 scfh scale range Letter omitted - Less Rotameter	A

4

Mounting Dimensions





1) With a relay or rotameter outlet at atmospheric pressure.
2) A flow indicator is recommended for use with the Model 62VN.

Series 63 Constant Differential Flow Controllers

Introduction

Features & Benefits

- Versatile end design accommodates liquids or gases and wide range of OEM needs
- Powder coating provides improved corrosion resistance

Description

The Series 63 Constant-Differential Relays are used in conjunction with an external needle valve to provide constant volume flow rates of liquids or gases over a continuously adjustable range.

For gas flow applications, compressibility must be considered if a constant mass flow is desired. Therefore, models are available for constant upstream or downstream reference pressure.

For liquids, which are not compressible, the constant volume flow will also be a constant mass flow, regardless of upstream or downstream pressures. As such, mass flow is independent of pressure changes.

The relay's needle valve determines rangeability and capacity. Four models are available.

Specifications

Range Limits

@20 psig supply
Model 63EU & Model 63SU
Maximum: 1.1 scfm
Minimum: 0.01 scfm

Model 63EU_ & Model 63SU_
Maximum: 2800 sccm
Minimum: 13 sccm

Supply Pressure

Minimum: At least 6 psi greater than the maximum downstream pressure of the needle valve-controller combination

Maximum:

	Needle Valve	
Model	**Closed**	**Open**
63EU	50 psi	250 psig
63EUL	50 psig	250 psig
63SU	100 psig	500 psig
63SUL	50 psig	500 psig

Ambient Temperature Limits

Model 63EU & Model 63EUL: -40 to 180°F (-40 to 82°C)
Model 63SU & Model 63SUL: -40 to 250°F (-40 to 121°C)

Supply Pressure

Minimum: At least 5 psig greater than the maximum downstream pressure of the needle valve-controller combination

Maximum:

	Needle Valve	
Model	**Open**	**Closed**
63ED	250 psig	100 psig
63EDL	250 psig	100 psig
63SD	500 psig	100 psig
63SDL	500 psig	100 psig

Ambient Temperature Limits

Model 63ED & EDL: -40 to 180°F (-40 to 82°C)
Model 63SD & SDL: -40 to 250°F (-40 to 121°C)

Controlled Differential

3.1 ± 5 psig (others optional)

Materials

	Brass Units	316 SS Units
Body	Brass	316 SS
Diaphragm	Neoprene	KYNAR
Differential Spring	18-8 SS	316 SS
Valve Plunger & Seal	303 SS	316 SS
Plunger Spring (used in "D" 63D models only) 63ED-L	316 SS Phos. Br.	316 SS 316 SS

Ratings

Ambient Temperature

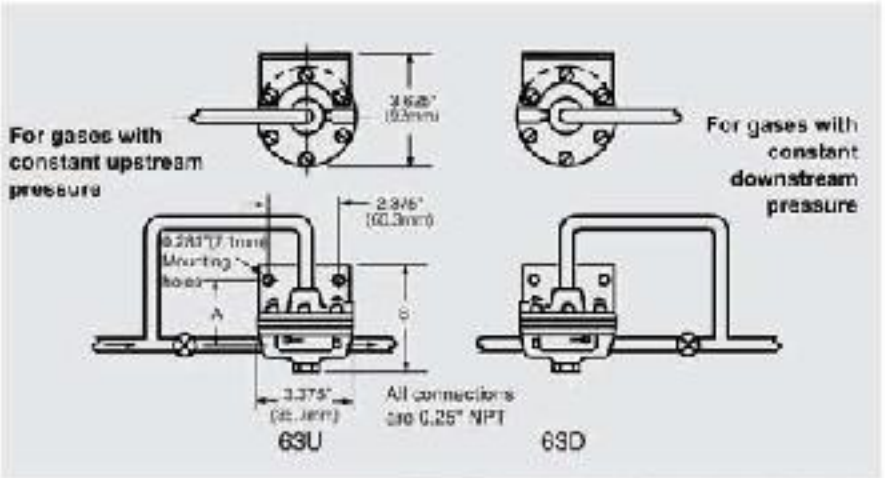
-40 to 180°F (-40 to 82°C)

Flow Capacity Formula

	Higher Range **Models 63BD and 63SD; 63BU and 63SU**	Low Flow **Models 63BD-L and 63SD-L; 63BU-L and 63SU-L**
GAS FLOW-CAPACITY		
Maximum at less than critical flow[1]	$SCCM = 4000 \sqrt{\frac{\Delta P \times Pd \times 530}{SG \quad T}}$	$SCCM = 400 \sqrt{\frac{\Delta P \times Pd \times 530}{SG \quad T}}$
Maximum at critical flow[1]	$SCCM = 2000\ Pu \sqrt{\frac{1 \times 530}{SG \quad T}}$	$SCCM = 200\ Pu \sqrt{\frac{1 \times 530}{SG \quad T}}$
Minimum controllable flow	Approximately 1/200 of maximum	$SCCM = 6\ \frac{\Delta P\ (Pu + Pd)}{Rv\ T}$
LIQUID FLOW-CAPACITY		
Maximum	$CCM = 47\ \sqrt{\frac{\Delta P}{SG}}$	$CCM = 47\ \sqrt{\frac{\Delta P}{SG}}$
Minimum	Approximately 1/200 of maximum	$CCM = .06\ \frac{\Delta P}{Rv}$
NEEDLE VALVE SIZING (With 3 psi drop across valve)		
For any liquid	$Kn = \frac{CCM}{\sqrt{6550\ \frac{1}{SG}}}$	
For any gas	$Kn = \frac{SCCM}{\sqrt{49000\ \frac{1 \times Pn \times 530}{SG \quad T}}}$	

Mounting Dimensions

Model	DIM. A	DIM. B
63BU	2 1/8"	3 1/4"
63BUL	2 1/8"	3 1/4"
63SU	2 3/8"	3 1/2"
63SUL	2 3/8"	3 1/2"
63BD	2 1/8"	3 1/2"
63BDL	2 1/8"	3 1/2"
63SD	2 3/8"	3 3/4"
63SDL	2 3/8"	3 3/4"



Note: Dimensions for 63D are mirrored from 63U

1) Critical flow exists when the ratio of upstream pressure (P_u) to downstream pressure (P_d) is equal to or less than approximately 0.53

Model 66 Amplifying and Reducing Relays

Features & Benefits

- Pneumatic signal conditioning provides control circuit design flexibility
- Powder coating provides improved corrosion resistance

Description

The Model 66 Amplifying and Reducing Relays are used to increase or decrease control-circuit pressure signals.

Its input pressure, acting upon the effective area of the top diaphragm, produces a force that is balanced by the force produced by the output pressure applied over the effective area of the lower diaphragm. Any imbalance in these opposing forces will operate the plunger, increasing or decreasing air supply to the output chamber. (The amplifying or reducing ratio is fixed by the ratio of input-to-output diaphragm areas.)

An increase in input opens the pilot valve to admit supply air directly to the output. A decrease in input opens the exhaust port to exhaust air from the output.

Specifications

Function Specifications

Supply Pressure

Normal: 20 psig (140 kPa)
Maximum: 80 psig (550 kPa)
Minimum: 1 psi (7 kPa) above maximum required output

Range Limits

80 psig max. for input or output - whichever limits

Overrange Limits

100 psig (690 kPa) at any connection

Maximum Output Pressure

Within 0.1 psi (0.7 kPa) of supply

Minimum Output Pressure

Less than 0.4 psig (3 kPa) with zero output

Ratio Accuracy

Within 1% of normal ratio

Linearity

±1% of output span

Reproducibility

Within 0.02 psi (0.15 kPa)

Operating Temperature

-40 to 180°F (-40 to 82°C)

Performance Specifications

Response Level

0.2" H_2O (5 mm H_2O)

Zero Error

66BA6: ±0.36 psi (2.5 kPa)
All Others: ±0.24 (1.5 kPa)

Flow Capacity

2.2 scfm minimum

Air Consumption

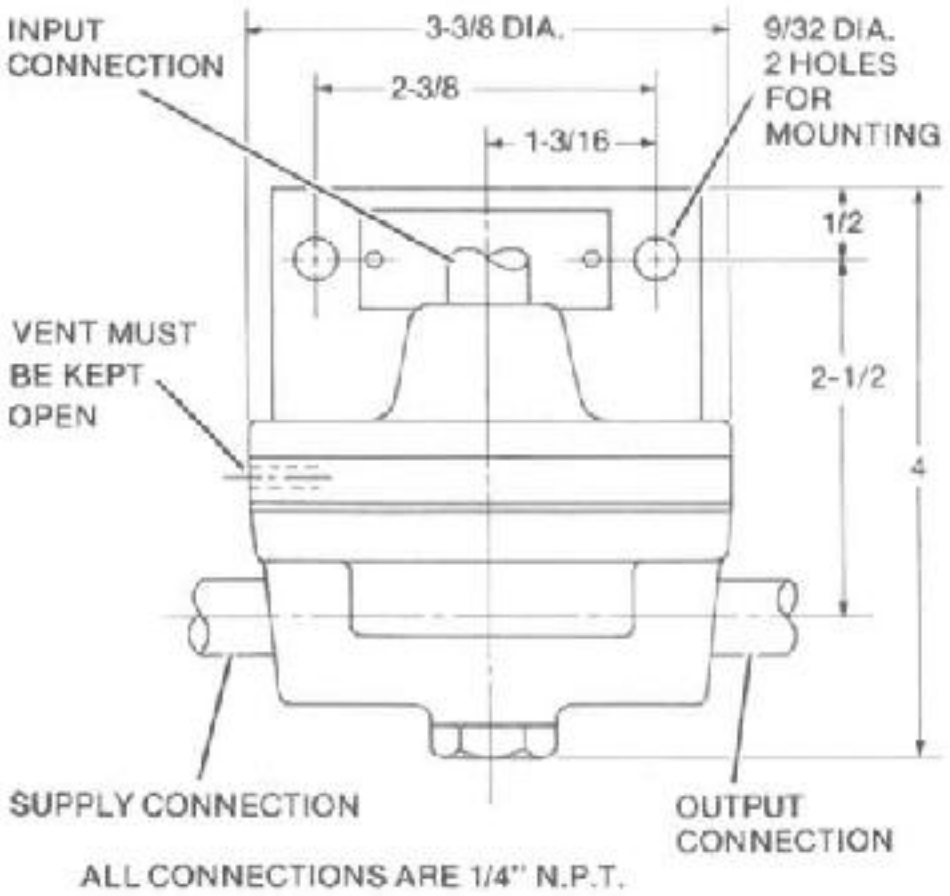
0.12 scfm maximum

Mechanical Specifications

Materials of Construction

Brass, aluminum, stainless steel, and Neoprene

Values based on 20 psig supply, unless otherwise noted.


INPUT CONNECTION
3-3/8 DIA.
9/32 DIA. 2 HOLES FOR MOUNTING
2-3/8
1-3/16
1/2
VENT MUST BE KEPT OPEN
2-1/2
4
SUPPLY CONNECTION
OUTPUT CONNECTION
ALL CONNECTIONS ARE 1/4" N.P.T.

Model 661 Amplifying Relays with Bias

Introduction

Features & Benefits

- Fixed-gain force and bias adjustment mechanisms amplify pneumatic instrument signals to provide control circuit design flexibility

Description

Series 661 Amplifying Relays are fixed-gain force-balance instruments, which incorporate bias adjustment that amplify pneumatic instrument signals. For example, a 3-15 psi signal can be amplified to operate a 3-27 psi control valve.

The input pressure signal, acting upon the effective area of the upper diaphragm, produces a force opposed by the force produced by the output pressure applied over the effective area of the lower diaphragm and by a manually-set (constant) spring force. Any inbalance in the opposing forces will operate the pilot valve to throttle supply air to change the output until rebalance is achieved.

Plus or minus biasing of the input signal is accomplished by changing the setting of the upper biasing spring, which alters the net spring force on the diaphragm assembly.

Specifications

Supply Pressure

Normal: 20 psig (140 kPa)
Maximum: 80 psig (550 kPa)
Minimum: 1 psi (7 kPa) above maximum required output

Range Limits

80 psig max. for input or output (whichever limits)

Overrange Limits

100 psig (690 kPa) at any connection

Minimum Output Pressure

Less than 0.1 psi (0.7 kPa)

Ratio Accuracy

Within 1% of nominal ratio

Linearity

±1% of output span

Reproducibility

Within 0.1% of output span

Response Level

0.2" H_2O (5 mm H_2O)

Bias Range

Direct Acting: +30 psi to -15 psi (210 to -100 kPa)

Flow Capacity

2.2 scfm minimum (62.3 SDM³/M)

Air Consumption

0.15 scfm maximum (4.25 SDM³/M)

Ambient Temperature Limits

-40 to 180° F (-40 to 82° C)

Materials of Construction

Brass, aluminum, stainless steel, and Neoprene

Model 661 Amplifying Relays with Bias

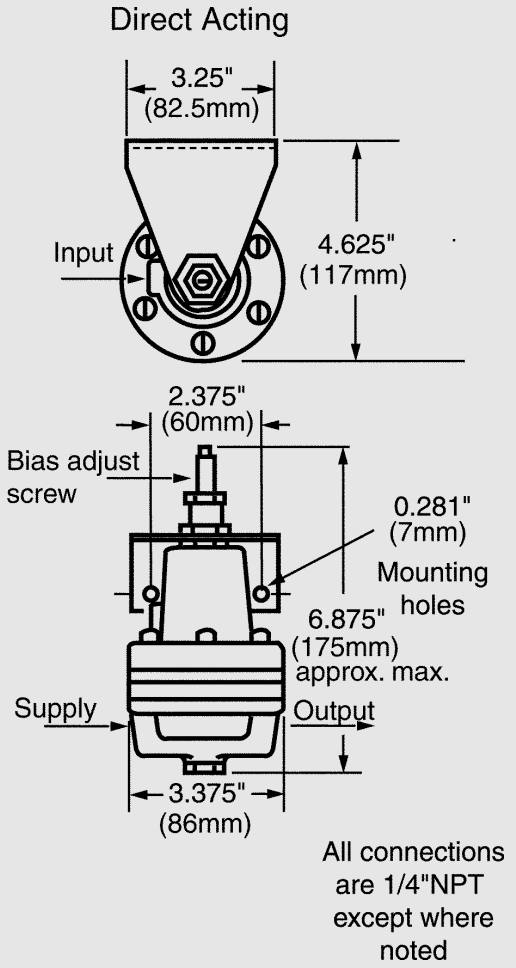
Technical data

Model Selection

Direct Action	
Model No.	**Gain**
661A2	2
661A3	3
661A4	4
661A6	6
Function Equation: $P_{out} = G (P_{in} \pm K)$	

Where P_{in} = input pressure
p_{out} = output pressure

Mounting Dimensions



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