Data Sheet
D-APE-TZID_3

Actuators & Positioners
Intelligent Positioners
Field Mount Units / Accessories
TZID, TZID Ex, TZID SS

- **Digital Communications:** HART® compatible via 4-20 mA or FSK modem. Local communication via RS232 interface
- **User Friendly:** Operator interface with menu and simple push-buttons on indicator panel. Expanded configuration via PC or Laptop with Smart Vision® software.
- **Selectable Choice of Transfer Characteristics:** Linear, equal percentage or customized curve with 21 points configurable in both X and Y axis.
- **Easy Setup and Calibration:** AUTOSTROKE function initializes valve without manual calibration adjustments. Automatic adaptation to actuators of different sizes
- **Available for Either Linear or Rotary Motion:** single or double acting with either “fail-in-place” or “fail open/close”
- **Non-contact Position Feedback:** Inductive sensor provices non contact high resolution position feedback.
- **Loop Powered 2-wire 4-20 mA Device:** No external power supply requred. Low compliance voltage (9.3 VDC).
- **Immune to Shock, Vibration, EMF, RFI:** uses same patented concept as the Sensycon 20/06 I/P
- **Ideal for Harsh Environments:** Rugged compact NEMA 4X housing. Wide operating temperature range:-40ºF to +180ºF (-40ºC to +85ºC).

Series TZID, TZID Ex, TZID SS
Field Mount Units/Accessories

Intelligent Positioners
Field Mount Units/Accessories

The TZID Intelligent Positioners is a versatile electro-pneumatic positioner that has digital communications, easily configurable, and suitable for field installation in arsh environments.

The Positioner provides modulating control of single-acting spring return and double pneumatic actuators. The microprocessor based design allows monitoringof the final control and element and two way communication via an RS232 interface or HART® link. Zero and span settings are achieved by initiating Autostroke which also determines the optimum calibration settings based on the specific process control conditions.

The TZID Intelligent Positioner is available with a number of selectable features and options. These include: Fail-in-place, analog or digital position feedback and special 316 stainless steel housing for extremely harsh and aggressive environments. The stainless steel version is especially suitable for a variety of industries including Chemical, Pulp & Paper, Pharmaceutical, Mining, Petroleum Refining, and Offshore Operations.

Engineering Specifications

Input

Signal Range	4-20 mA, two-wire Partial ranges from 4 mA, span as required Configurable (e.g. for split/ range operation)
Compliance voltages	9.3 V DC (10.6 V DC for Ex version)
Resistance	465 Ω at 20 mA (530 Ω for Ex version)

Output

Control pressure	0-90 psi (0-6 bar)
Air performance	6 kg/h = 5Nm3/h = 3 scfm at 20 psi supply pressure 13 kg/h = 11Nm3/H = 6.5 scfm at 90 psi supply pressure
Function	Single or double acting
Effective direction	Scanned and set automatically in the course of automatic identification (self-balancing program); positioning direction with increasing air pressure
Shut-off point	Adjustable for 0...20% of signal range (if the valuve falls below the set value then the positioner immediately moves the valve to the closed position)

Positioning travel (position feedback)

Rotation angle	Max. 60º for linear valve and max. 90ºfor rotary valve. The rotation angle for the full control path is automatically derived in the course of identification (self-balancing program).
Positioning time for traversing the full path	Can be modulated over and above the natural actuating time of the valve with an electronic parameter in the range 0...100 seconds (determinable separately for both positioning directions)
Actuating time monitoring	Time parameter adjustable from 0...100 seconds (If the positioner is unable to move the control deviation to the dead band within the set time then a message is issued both via the communication terminal and through the optional “digital feedback” module).
Positioning path limiting	Min. - Max. limits freely selectable within 0...100% of positioning travel.

Power Supply

Instrument Air	Oil, water and dust-free to DIN/ISO 8573-1 Max. particle size 5 microns
Supply pressure	20 to 90 PSI (1.4 to 6 bar) Caution: Do not exceed the maximum working pressure of the actuator!
Air requirement	<0.01 scfm at 20 psi supply

Transmission data and influencing parameters

Characteristic (effective direction)	Rising: actuating signal 4...20 mA / control point 0...100% Falling: actuating signal 20...4 mA / control point 0...100%

Transmission data and influencing parameters

Characteristic	Linear or equal percentage (1:25 or 1:50 or 25:1) or freely definable with 21 interpolation points
Characteristic deviation	< 0.5%
Dead band	Adjustable from 0.2 to 10%
Resolution	8000 steps
Scanning period	20 msec
Effect of ambient temperature	<0.5% / 10K
Effect of mounting position	Negligible
EMC	EMC directive 89/336/EEC as of May 1989
Interface	RS232 HART protocol

Environmental Capabilities

Ambient temperature	-40ºF to +85ºC for operation, storage and transport	
Explosion protection	ATEX:	EEx ia IIC T4/T5/T6
	British:	EXN IIc T6
	FM:	
	Intrinsic safe:	Class I, II, III, Div 1, Group A-G
	Non-Incendive:	Class I, II, III, Div 2, Group A-G
	CSA:	
	Intrinsic safe:	Class I, Div 1, Group A-D
	Non-Incendive:	Class I, Div 1, Group A-D

Preliminary data		Basic Unit	Module for feedback	
			Analog	Digital
Effective internal capacitance	C_i	<1.2 nF	<120 nF	*
Effective internal Inductance	L_i	<50 µH	*	*
Max. values In case of Fault	V_i	30V 29.6V	29.6V	
	I_i	150 mA	203 mA	203V
	P_i	1100 mW	1500 mW	1500 mW

* = values negligible

Ambient temperatue	T4	max. 85ºC
	T5	max. 55ºC
	T6	max. 40ºC

Case

Material	Aluminum, Epoxy-coated
Degree of protection	NEMA 4X
Connections,	Screw terminals, for 2.5 mm^2,
Electrical	with 1/2" NPT
Weight	7 lbs.
Mounting position	As required

Options

Supplementary module for analog position feedback	Signal range: 4...20 mA, two-wire Power supply: 12...25 V DC Normal or Ex protected

(See Specifications for further information on Ex protection) In addition a signal control to 3.5 or 21.5 mA can be activated (definable through configuration) if there is an error in the self-test routine or the alarm value of the actuation time monitoring is exceeded.

Supplementary module for digital feedback

Option no longer available.(July 2005)

Mechanical kit for digital feedback	2-slot type initiators SJ2-SN (safety engineered) for min. and max. control point Alarm values adjustable within 0...100%, positioning travel/rotation angle adjustable (alarm independent of the software and electronics of the positioner) Control circuit meets DIN 19234 (Namur) Normal or Ex protected (See Specifications for further information on Ex protection) Control voltage 5...25 V DC Control current <1 mA for switching state “0” Control current >3 mA for switching state “1”

Accessories

Add-on Kit for linear actuators (Travel)	(Lateral attachment meets DIN/IEC 534/Namur)
170 mm lever for linear actuators,	stroke 10...150 mm.
Add-on bracket for rotary	(Attachment meets VDI/VDE 3845) Dimension A/B = 80/20
actuators 90º	80/30 - 130/30 -or 130/50 mm

Pressure gauge block with terminal or 1/4” NPT	Including attachments for direct mounting plus, optionally - Pressure gauge ∅40 mm Case, plastic, black IP 65 Range 0...4 bar/0...psi or 0...10 bar/0...140 psi (2 x for single action, 3 x for double action)
Filter	Coalescing filter type removes liquid aerosols and sub-micron particles 1/4” NPT process connection 30 SCFM flow capacity.
Regulator	Quick response and accurate pressure regulation. 1/4” NPT process connection 30 SCFM flow capacity
PC adaptor for communication	LCI adapter for RS232 FSK modem for HART® communication
Operator interface	Smart Vision

The Concept

The TZID positioner belongs to a new intelligent and configurable generation of devices. High-tech electronics are coupled with a robust mechanical construction on the pneumatic side to yield an optimal design: The TZID from ABB.

The TZID is a 2-wire device requiring only a base current of 4 mA to power the electronics. This is derived from the 4 - 20 mA input signal. The only external energy connection required is compressed air. The TZID consumes only 0.01 SCFM. The I/P conversion is done by the same patented concept as the SENSYCON 22/ 06 I/P which has a field-proven immunity to shock, vibration, EMF and RFI.

The transmission of the movement of the actuator to the positioner is accomplished by utilizing a cam and a patented non-contact inductive sensor. Thus the only moving part in the TZID is the axis rotated by the actuator on which the cam is mounted. The result is a very low wear rate and insensitivity to shock and vibration. An ideal combination for operation and maintenance. The same analog signal produced by the inductive signal not only provides the position feedback for the positioner control but can also be used to provide the optional position feedback and alarm limit outputs.

The signal modulated by the I/P module is continuous and eliminates the dead time between digital switching and enables a precise and sensitive control of the control point. Modulation with automatic adaptation to actuators of different size occurs in a very short time. Thus the TZID is ideal for valves of all sizes without any special manipulation.

The TZID is housed in a robust NEMA 4X aluminum housing with epoxy coating. The covers are hinged and ribbed and gasketed to maintain easy access and enclosure integrity. A separate chamber is provided for electrical terminations. To compliment its suitability for harsh environments a wide operating temperature range

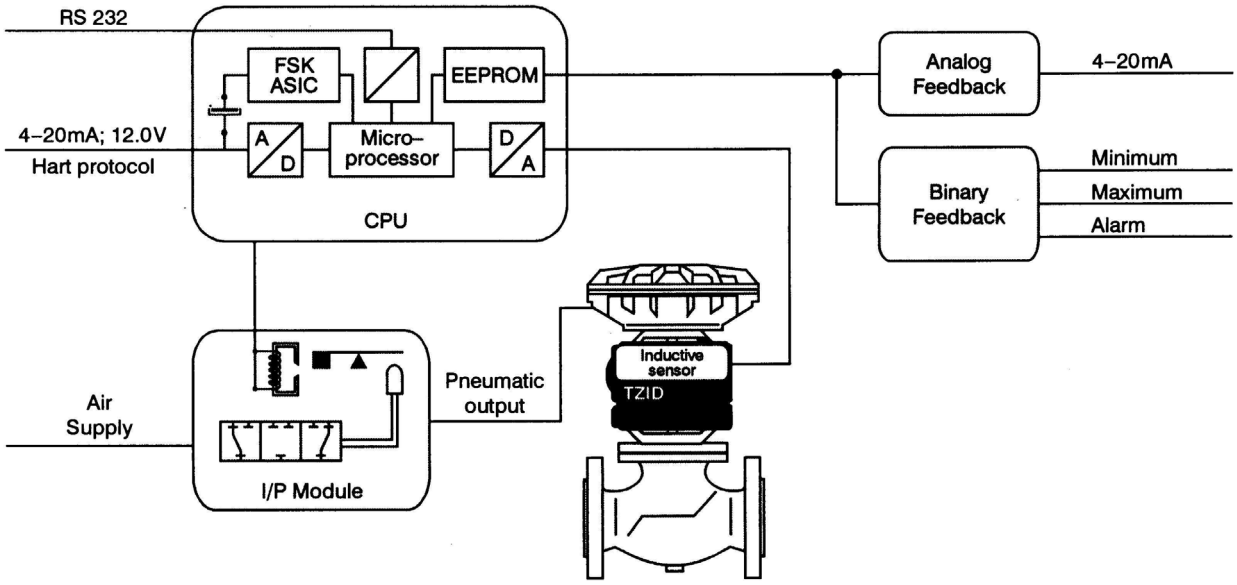
Special Application with remove position sensor

The TZID positioner is designed for a wide operating temperature range of -40ºF to +185ºF and has high shock and vibration immunity (<1% up to 10g/80Hz). Optionally for extreme applications such as high temperature environments or high process vibrations the TZID can be provided with a remote mounted positioner. The remote configruation consist of two TZID housings and a intrconnecting cable.

Description

- One housing contains the postioner sensor/cam arrangement as well as the mounting interface for linear or rotary actuators (depending on Nomenclature).
- The second housing contains the electronics and I/P converter. This enclosure also includes the signal terminals and pressure connections.
- The two enclosures are electrically connected by a shielded 4-wire cable with a standard length of 32 ft (10m).
- The housing containing the electronics is limited to ambient temperatures of up to 185¹F (85ºC) while the position sensor housing can be mounted in an ambient temperature of up to 230ºF (110ºC).

TZID Schematic Diagram



Operation / Communication

The TZID positioner is provided with an operator panel for local control and input of certain parameters. Locataed on this panel is a 3-1/2 digit LCD display, 3 push-buttons and 1 rotary switch. Directions and a menu are printed on the panel to provide for easy reference and operation.

Digital communication provides continuous monitoring, and read out and adjustment of all operating parameters, even during operation. As the parameters configurable by the operator are limited, a high degree of operating security and integrity is provided via remote control from the control room.

Communication with the TZID positioner can be accomplished by either a local interface or via HART (FSK) protocol.

The local interface is to a standard RS232 through a connection port provided on the operator panel. Communication and complete configuration can be done with the local interface without the need for an input signal.

Communication using HART protocol is accomplished over the 4-20 mA input signal or in a bus structure but does require at least a 4 mA signal. The SmartVision software provides a standard application for the TZID for easy configuration, monitoring and file management.

Accessory items needed for connection to a PC or laptop can be supplied if required.

The Computer / Program

The TZID program is run on a 16-bit CPU. The scanning period is 20 milliseconds. Configuration data is stored in EEPROM and is retained in the event of power failure. A/D conversion is with a resolution of 8000 steps. In addition to the control algorithm for setting the control position, the program execution also includes:

- Automatic identification of the valve in terms of the positioning travel (Stroke length or angle of rotation) and the effective direction (Valve action - direct or reverse)
- Automatic determining and setting of the control parameters (AUTOSTROKE)
- A self-test routine with error messages at the LCD display, via digital communication and the binary feedback option
- Control of the speed of positioning travel to set value (Stroke speed - Configurable parameter)
- Alarm for limit violation ("min." and "max." can be configured parameters for correction time and control point)

Optimal Matching to Operating Conditions

Adaptation to operating parameters is in part automatic through "AUTOSTROKE" and in part through manual input either at the operator panel or by digital communication. When using a PC connected via the communication port, the TZID can be connected to a system already running without engaging the AUTOSTROKE function.

Parameters which are set automatically:

- Valve action (Direct or reverse)
- Positioning travel (Stroke length or angle of rotation)
- Parameters for the control algorithm

Parameters which are set manually:

- Signal input 4-20 mA as full or split range
- Shut-off point (underranging of the set value results in the positioner immediately switching to the closed position)
- Stroke time for full stroke or rotation (Can be set independently for both directions)
- Correction time monitoring via adjustable time parameters (if the positioner is not able to drive the control deviation into the dead band within the set time then an alarm is generated).
- Stroke limiting (Min. and Max. limiting for open and closed)
- Dead band (Hysteresis - adjustable 0.2 to 10%)
- Valve action
  Direct: Input 4-20 mA/control point 0...100%
  Reverse: Input 20-4 mA/control point 0...100%
- Transfer characteristics
  Linear
  Equal percentage (1:25 or 1:50 or 25:1)
  Freely configurable (21 interpolation points in X and Y axis)
- Min. and Max. alarm limits for control points (Digital Feedback)
- Identification number / Day number (2 lines each with max. 32 characters)

Smart Vision® Software for the TZID Positioner

The Smart Vision® Software provides an excellent operator interface for use with the **TZID Positioner**. It is a graphics windows-type software with user friendly standard menu mode.

Help information can be called up at any time with the F1 key. Control is via a mouse or keyboard. The installation program is available in different languages and the communication interface can be selected as required. Access to the configuration program can be password protected. Smart Vision enables:

- Individual ON-LINE configuration with plausibility checks
- Data bank set up
- ON-LINE configuration from the data bank
- ON-LINE feedback documentation from the TZID
- Measured value logging from the TZID during operation

Hardware requirements for use of Smart Vision® Software:

Minimum equipment:
- Intel-Pentium II processor 233 MHZ or compatible
- 64 MB main RAM
- 50 MB free hard dish space
- Microsoft Windows 95, 2000, NT 4.0 with service pack 5
- SMART VISION for Windows 3.1x is available on request.
- Internet Explorer 5.0

Recommended equipment
- Intel-Pentium III processor 450 MHz or compatible
- 128 MB main RAM
- 50 MB free hard disk space
- Windows NT 4.0 with service pack 5 or 6a
- Internet Explorer 5.0

Model Number Designation

Order Information

V18341 = TZID Model Code	**V18341H-** 01 - 08	09	10	11	12	13	14	15	
TZID Intelligent Positioner									
Housing									
Aluminum with epoxy coating: NEMA 4X, IP 65		A							
Stainless Steel (316, 1.4581): NEMA 4X, IP 65		S							
Actuator Type									
Linear, 0.4" to 3.3" (10 to 85 mm) stroke (Aluminum Housing)			5						
Linear, 0.4" to 3.3" (10 to 85 mm) stroke (SS Housing)			5						
Linear, 0.4"-3.3"stroke (Aluminum Housing) Remote Mounted Electronics[3]			Y	0				0	
Rotary, 90º rotation, NAMUR-VDI/VDE 3845 (Alum. Housing)			6						
Rotary, 90º rotation, NAMUR-VDI/VDE 3845 (SS Housing)			7						
Rotary, 90º rotation, NAMUR-VDI/VDE 3845 (Aluminum Housing) Remote mounted electronics[3]			Z	0				0	
Agency Certification									
General Purpose				0					
ATEX I.S. Eex ia IIC				1					
ATEX I.S. Eex ia IIC with flammable gas air supply (Alum. Housing)				2					
FM Intrinsically Safe/Non-Incendive CL I, II, III; Div 1,2 Gr A-G				3					
British Standards Non-Incendive EX N IIC				4					
ATEX I.S. Eex ia IIC with flammable gas air supply (SS Housing)				5					
Control Action/Failure Mode on Loss of 4-20 mA Input									
Single Acting/Fail Open/Close					1				
Single Acting/Fail-in-Place					2				
Double Acting/Fail Open/Close					4				
Double Acting/Fail-in-Place					5				
Connections									
Electrical: 1/2-14 NPT Pneumatic: 1/4-18 NPT (Required for FM units)						2			
Electrical: Pg. 13.5 Pneumatic: 1/4-18 NPT						3			
Electrical: M20 x 1.5 Pneumatic: M12x1						4			
Electrical: M20 x 1.5 Pneumatic: 1/4-18 NPT						5			
Position Feedback Module									
Analog 4-20 mA General Purpose[1]							1		
Analog 4-20 mA FM/CSA approved, I.S., Non-incendive Cl I, II, III; Div. 1, 2; Gr A-G							2		
~~Digital output (3) for min/max and general alarm FM/CSA approved~~ *Note (4)*							~~6~~		
None (but with Proximity Limit Switches) Select from 2 or 4 below							8		
None							9		
Mechanical Limit Switches [2]									
None								0	
Two P&F slot-type proximity switches (Normally Closed)								2	
Two P&F slot-type proximity switches (Normally Open)								4	

Notes: (1) Option Code 1 in this field is for a standard purpose 4-20mA feedback module.
Option 2 is offered in place of the general purpose.
(2) TZID with mechanical limit switches is only ATEX approved.
(3) Remote mounted version only availabe in "general purpose".
(4) Obsolete option effective July 2005

Standard Product =

Model Number Designation - *continued*

Accessories

Mounting Hardware	
Mounting Kit for linear actuators, stroke 0.4 to 3.3" (designed to IEC534-1 or NAMUR)	319601
Optional Feedback arm for linear strokes greater than 3.3" (strokes 0.4" to 5.9")	319602
Mounting Bracket for rotary actuators, 90º, (designed to VDI-VDE 3845)	
80/20 mm	319603
80/30 mm	319604
130/30 mm	319605
130/50 mm	319606
Mounting Kit for Neles BC/BJ	7959096
Mounting Kit for Neles BC/U & BJ/U	7959097
Mounting Kit for Foxboro V724/V726/V713	319601
Mounting Kit for Fisher 657A/667	7959155
Mounting Kit for Fisher 1051/30 & 1052/30	7959135
Mounting Kit for Fisher 1051/60 & 1052/60	7959169
Mounting Kit for Bettis RPC/CBA/G Series	319603
Mounting Kit for Masoneilan Rotopact 400-90	7958312
Mounting Kit for Masoneilan Varipak 28000	7959164
Mounting Kit for Masoneilan Camflex II & Varimax 30000	319641
Pressure Gauge Block	
For single-acting output (with 1 pressure gauge for air supply and 1 pressure gauge for output pressure) Connections 1/4-18 NPT, supply air pressure range 0-10 bar / 0-140 psi	
Output pressure range 0-4 bar / 0-60 psi aluminum version[2]	7959064
Output pressure range 0-4 bar / 0-60 psi stainless steel version[3]	7959067
Output pressure range 0-10 bar / 0-140 psi aluminum version[2]	7959030
Output pressure range 0-10 bar / 0-140 psi stainless steel version[3]	7959045
For double-acting output (with pressure gauge for air supply and 2 pressure gauges for output pressure) Connections 1/4-18 NPT, supply air pressure range 0-10 bar / 0-140 psi	
Output pressure range 0-4 bar / 0-60 psi aluminum version[2]	7959065
Output pressure range 0-4 bar / 0-60 psi stainless steel version[3]	7959069
Output pressure range 0-10 bar / 0-140 psi aluminum version[2]	7959031
Output pressure range 0-10 bar / 0-140 psi stainless steel version[3]	7959046
Regulator + Bracket (1/4 - 18 NPT connections) [4]	
Parker No. 05R118AD 125 psi max	1951029D5
Filter + Bracket(1/4 - 18 NPT connections) [4]	
Parker No. 15F14HA 250 psi	5328563D2

Notes:

1. *The pressure gauge blocks are delivered as separate units for self-assembly.*
2. *Aluminum version: Aluminum pressure gauge block, painted black (like case) pressure gauges with black plastic case.*
3. *Stainless Steel Version: Pressure gauge block made of stainless steel 1.4571 pressure gauges with stainless steel case.*
4. *Filter & Regulator delivered as separate units for self assembly.*

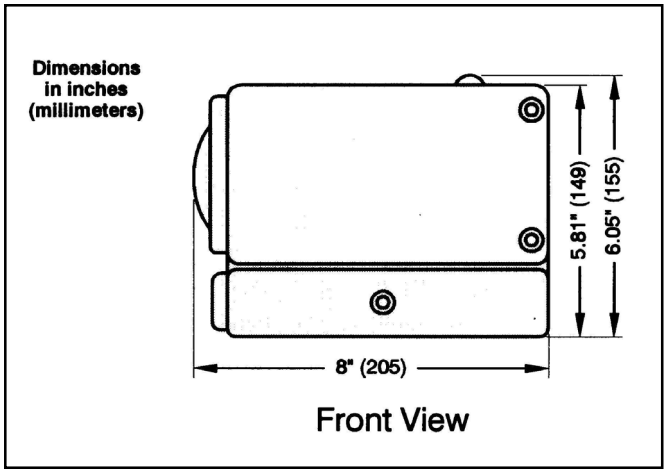
Standard Product =

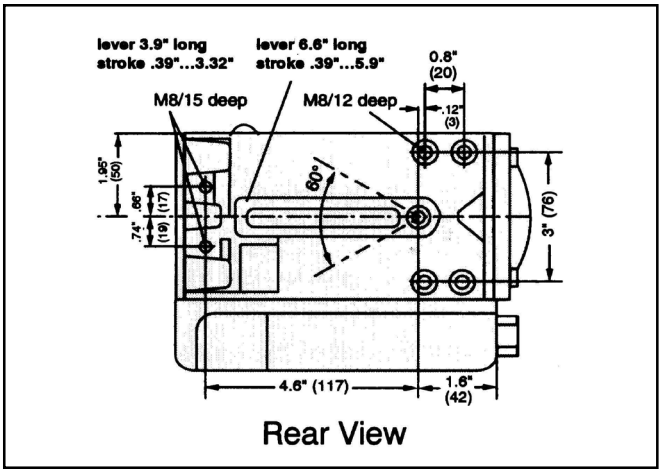
Accessories - *(continued)*

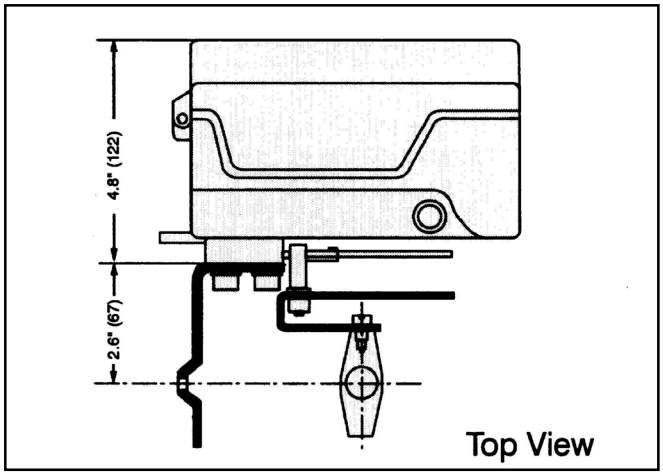
Communication Devices		
Local Communication adapter for RS 232 connection (LCI)		18389 - 0319621
HART® Communication modem for USB Connection		010031F
HART® Communication modem		010001F
SmartVision 4 CD-ROM		SM401-1
Spare Parts Modules		
I/P Module, Single Acting Fail Open/Close		18381-0-0010000
I/P Module, Single Acting Fail In Place		18381-0-0020000
I/P Module, Double Acting, Fail Open/Close		18381-0-0040000
I/P Module, Dobule Acting, Fail In Place		18381-0-0050000
4-20 mA Position Feedback Module		18381-0-0000400
4-20 mA Position TX with for 48V supply		18391-7959193
~~Digital Position Feedback Module no IS protection~~	*Note (4)*	~~18381-0-0000600~~
Instruction Bulletin *(One copy supplied with order at no charge)*		42/18-54.1 EN

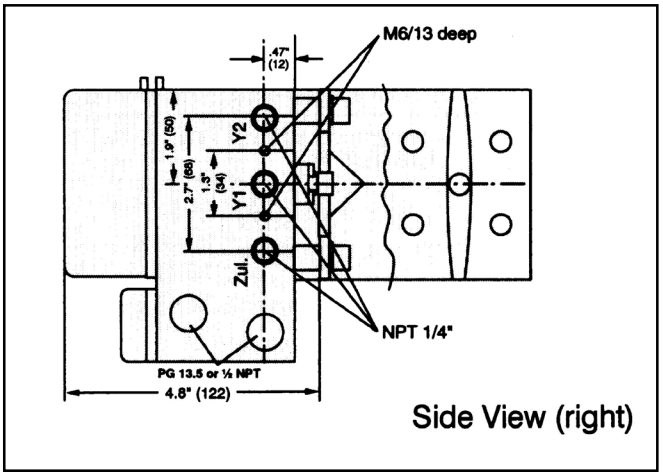
Note: (4) Obsolete option effective July 2005

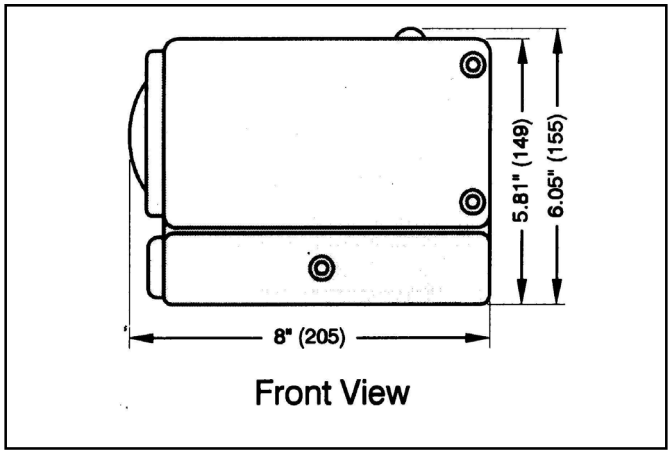
CF = Consult Factory *Standard Product =*



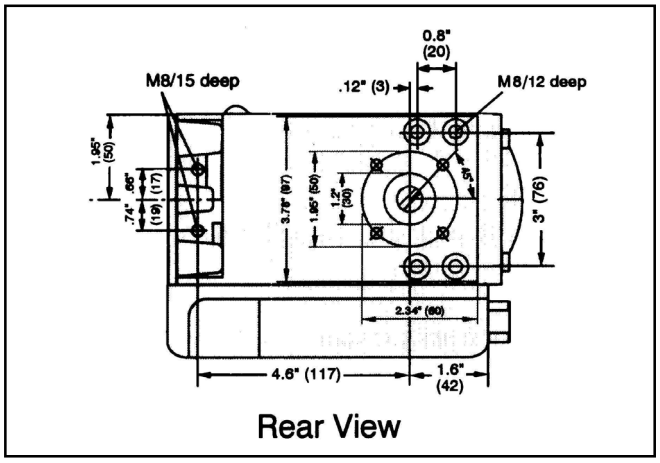




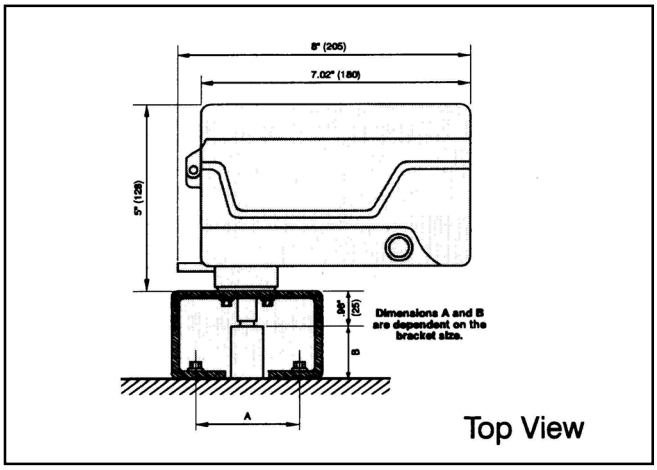




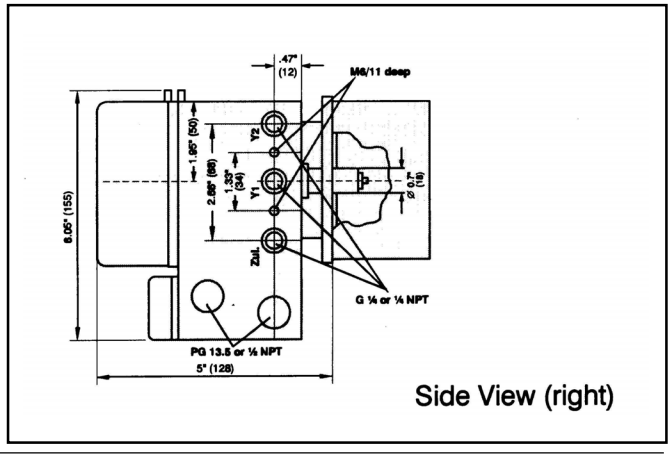
Front View



Rear View



Top View



Side View (right)

Notes

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Printed in USA (1.28.06)

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D-APE-TZID_3