ER3000 Kits

ER3P-XXXXXXXXXXX
ER3B-XXXXXXXXXXX

CONTENTS

ER3000 Kit

1 Introduction

This manual is valid only for ER3000 Kits I & II of the type ER3P and ER3B. The instructions for individual components must also be considered and are either attached in the appendix or supplied separately.
These instructions are important for all personnel who install, operate and maintain this equipment. It is assumed only qualified personnel with knowledge of the general safety rules and handling procedures of pressurized fluids and pressure equipment will perform this work. Ensure the availability of this manual to these personnel.

2 Safety Instructions

WARNING! Do not attempt to select, install, use or maintain this product until you have read and fully understood the TESCOM Safety, Installation & Operation Precautions.

3 Product Description

The ER3000 Kits are designed to ease the procurement, setup and installation of the basic equipment needed for the most common pressure reducing and back pressure control applications. All the necessary components are supplied in one kit to save the user time and the inconvenience of not having all the accessories and interconnections needed to get the system up and running.
The heart of the kit is the ER3000, a unique and flexible electropneumatic closed loop PID controller. The pneumatic output of the ER3000 loads the dome or air-actuator of a mechanical regulator. The pressure at the control port of the mechanical regulator is measured by a transducer and fed back to the ER3000, which instantly compares the feedback to the set point and makes the necessary adjustments.

Kit Benefits:

Very high pressure stability
- pressure is independent of the flow (eliminates droop)
- pressure is independent of the input pressure (eliminates decaying inlet effect)

Automation
- pressure can be controlled by a signal from a PC or PLC
- easy integration into automated test cycles

Data Acquisition
- Pressure data can be transferred to the computer without additional hardware
- Windows Tune program includes a data acquisition routine

Kit Level of Integration

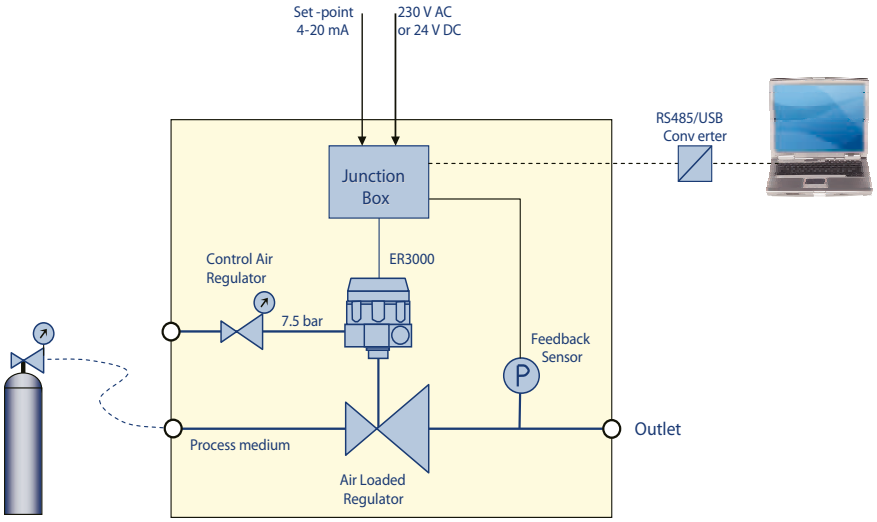
The kits are available in two levels of integration:

- **Kit I:**
  Individual components selected to meet the application's pressure control requirements. The ER3000 is pre-configured with typical PID parameters established for the selected regulator. Installation and set-up of the equipment is the responsibility of the customer.

- **Kit II:**
  Components of Kit I mounted on a back-plane and professionally plumbed together. Version with a sturdy, industrial enclosure also available. All electrical connections are made via junction box. The system is factory leak and performance tested and the ER3000 PID parameters are pre-set for this system.

Typical Pressure Reducing Application

With both kits, the customer has a choice of the most versatile mechanical regulators to cover a wide range of applications, both pressure reducing and back pressure, with a selection of the most common sealing materials.



The set point can be either an analog 4 - 20 mA or 1 - 5 volt signal or an RS485 serial signal from a computer. A converter to change the signal to RS485 from RS232 or USB is available with the kit. The PID parameters can be fine tuned using the supplied Tescom software loaded on the PC. In the case of an analog set point, the PC connection is needed only once for optimizing the PID parameters.

Regulator families

Pressure Reducing Regulators	
26-2000	High pressure regulator to control various output ranges up to 10,000 psig/690 bar, segregated captured vent. Available in SST and brass with a wide selection of seat and O-Ring materials
DK	Highly accurate and sensitive regulator with captured vent for low pressure (90 psig/6 bar) or mid range applications (600 psig/40 bar) requiring significant flow capabilities. Available in SST and brass.
44-5200	Piston sensed, venting regulator for mid-pressure range, low flow applications (600 psig/40 bar). Available in SST and brass.
Flow booster	Low pressure (90 psig/6 bar), high flow diaphragm regulator for air or nitrogen service. Zinc body.
Back Pressure Regulators	
26-1700	High pressure regulator to control various back-pressure ranges up to 10,000 psig/690 bar. Available in SST only with a wide selection of seat and O-Ring materials
54-2100	High pressure regulator to control various back-pressure ranges up to 10,000 psig/690 bar. Specially designed for hydraulic applications (metal seat), available in SST only.

Accessories:

The Kits are shipped with all the accessories needed for easy installation:

- 4 – 20 mAmp Feedback Transducer with 1/4" NPT port
- Pressure reducing regulator with gage to supply air to the ER3000.
- Set of commonly used assembly items:
  - 8/32 UNC Mounting screws
  - ER vent port muffler
  - T-piece for transducer
  - NPT connector for ER3000 to air loader
  - NPT plug and cable strain relief
- ER3000 cable
- Transducer cable
- Optional junction box with power supply for easy connection of the ER3000, transducer and setpoint source
- Converter options of USB or RS232.

4 Technical Data

Dash Code	Regulator Series	Transducer pressure range psig/bar	Max. Input Pressure psi/bar	Flow Coefficients	Body Material	Temperature °F (°C)	Venting	Weight approx. lbs. (kg)
ER3P-X Pressure Reducing Regulators								
A	Flow Booster	0 - 100/ 0 - 6	300/20	Cv: 1.5	Zinc	39 to 118 (+4 to +48)	yes	1.6 (0.75)
B	Flow Booster	0 - 100/ 0 - 6		Cv: 2.5	Zinc	39 to 118 (+4 to +48)	yes	1.6 (0.75)
C	DK, dome loaded	0 - 100/ 0 - 6	1000/70	Cv: 0.35	Brass	-4 to 163 (-20 to +73)	yes captured	3.9 (1.8)
D	DK, air loaded	0 - 100/ 0 - 6		Cv: 0.35	Brass	-4 to 163 (-20 to +73)	yes captured	6.2 (2.8)
E	44-5200	0 - 500/ 0 - 40	3500/240	Cv: 0.15	Brass SST	-13 to 199 (-25 to +93)	yes	4.4 (2.0)
F	26-2000	0 - 1000/ 0 - 100	Brass: 6000/414 SST: 10,000/690	Cv: 0.06	Brass SST	-13 to 199 (-25 to +93)	yes captured	7.7 (3.5)
G	26-2000	0 - 2000/ 0 - 160		Cv: 0.06	Brass SST	-13 to 199 (-25 to +93)	yes captured	7.7 (3.5)
H	26-2000	0 - 5000/ 0 - 400		Cv: 0.06	Brass SST	-13 to 199 (-25 to +93)	yes captured	7.7 (3.5)
J	26-2000	0 - 10,000/ 0 - 600		Cv: 0.06	Brass SST	-13 to 199 (-25 to +93)	yes captured	7.7 (3.5)

Dash Code	Regulator Series	Transducer psig/bar	Max. Input Pressure psig/bar	Flow Coefficients	Body Material	Temperature °F (°C)	Venting	Weight approx. lbs. (kg)
ER3B-X Back Pressure Regulators								
A	26-2100	1450/100	10,000/690	Cv: 0.08	SST	-13 to 165 (-25 to +74)	NA	7 (3.2)
B	26-2100	2320/160		Cv: 0.08	SST	-13 to 165 (-25 to +74)	NA	7 (3.2)
C	26-2100	5800/400		Cv: 0.08	SST	-13 to 165 (-25 to +74)	NA	7 (3.2)
D	26-2100	8700/600		Cv: 0.08	SST	-13 to 165 (-25 to +74)	NA	7 (3.2)
F	26-1700	1450/100		Cv: 0.14	SST	-40 to 165 (-40 to +74)	NA	7 (3.2)
G	26-1700	2320/160		Cv: 0.10	SST	-40 to 165 (-40 to +74)	NA	7 (3.2)
H	26-1700	5800/400		Cv: 0.10	SST	-40 to 165 (-40 to +74)	NA	7 (3.2)
J	26-1700	8700/600		Cv: 0.10	SST	-40 to 165 (-40 to +74)	NA	7 (3.2)

Specifications

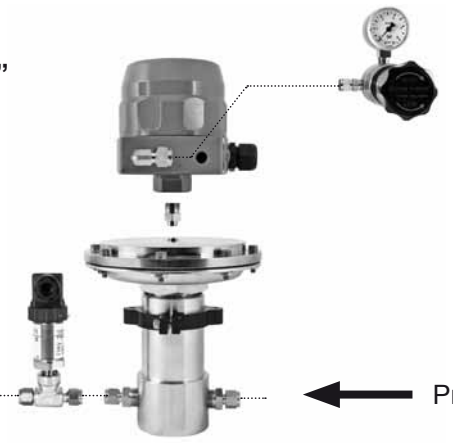
ER3000	
Power supply	24 V DC (22V to 28V) 180 mA Nominal
Supply Media	Clean, dry, inert gases or shop air
Supply Pressure	110 psig/7.5 bar nominal, maximum 120 psig/8.0 bar
Input signals	Set Point: 4-20 mA, 1-5 V or digitally RS485 Feedback: 4-20 mA, 1-5 V
Housing	NEMA 4X / IP64 weight 1 kg
	Please see ER3000 User Manual for additional specifications
All Regulators	See Individual Drawings for regulator specifications
Pressure Transducer	
Output Signal	4 - 20 mAmp, 1 - 5 V DC
Accuracy	0.25% or 0.1%
Connection	¼" NPT
Power Supply	24 V DC, connector: 175301-803A
Housing	NEMA4X / IP65, weight: 0.3 kg

5 Installation

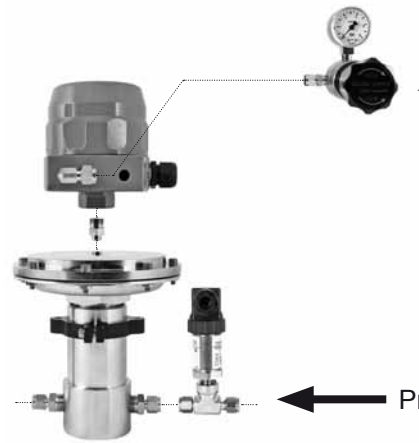
Warning: Installation of pressure components should only be performed by trained personnel. All national and international rules and regulations must be followed.

Overview

Pressure reducing version "ER3PP"



Back Pressure version "ER3BP"



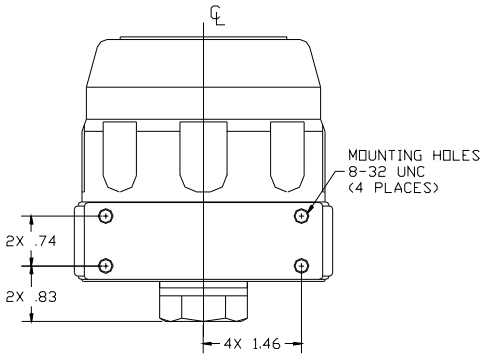
Mechanical Regulator

Install the mechanical pressure regulator as required by your application. Make sure that the tubing is thoroughly cleaned and that no chips or debris can reach the regulator valve. A 40 µm filter is recommended to be installed in the inlet path.

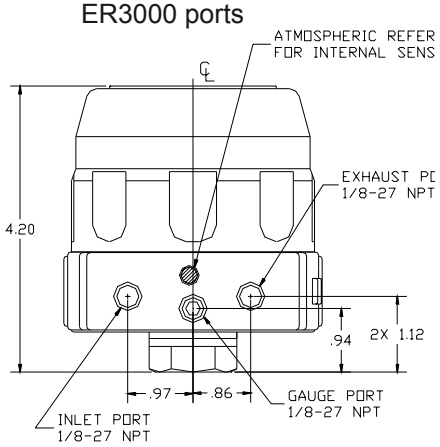
Inlet and outlet ports are laser marked on the body of the regulator.

ER3000

ER3000 mounting holes



ER3000 ports



The ER3000 can be installed either directly on top of the regulator's air loader using the supplied adapter or using tubing between ER3000 outlet and regulator dome/air loader.

- Length between the ER and the dome of the regulator should be as short as possible – as the length increases, so does the response time.
- Tubing between the ER and regulator must be able to handle up to 120 psig/8.5 bar.
- The ER can be oriented in any position.
- Connect ER3000 inlet port (NPT 1/8") to the air supply (direct shop air or control air regulator). Tubing must be able to handle up to 120 psig/8.5 bar.
- Installation of a 40 µm filter is recommended on the inlet of the ER3000.
- The supplied muffler may be installed in the ER exhaust port (NPT 1/8") if desired.

Transducer

Connect transducer on the control port of the regulator using the supplied T-piece
The position of the transducer should be close to the regulator for a fast regulator response (no delay time). If the response time is not critical to the application, the transducer can be mounted close to the point of use.

Wiring

Wiring is simplified using the Junction Box, minimizing noise problems caused by long, messy cable lengths. For details see chapter on "Wiring". When installing, consider the following:

- Mount Junction Box close to the ER3000.
- Run the ER cable to the junction box, feeding it through the strain relief marked ER. Shorten cable as needed and connect to terminal strip.
- Run the transducer cable to the junction box,feeding it through the strain relief marked Transducer. Shorten cable as needed and connect to terminal strip.
- Connect power supply to the appropriate source.
- Analog control: Connect set point signal to the junction box.
  Serial control: Connect RS485 cable to the junction box and the appropriate computer port.
  See Section 6 for wiring details.

System Leak Check

- Switch on the ER3000's power supply.
- Slowly apply ER supply pressure and then process pressure. Set the output pressure to a safe value.
- Check all fittings for tightness using leak test fluid. No bubbles should be seen.

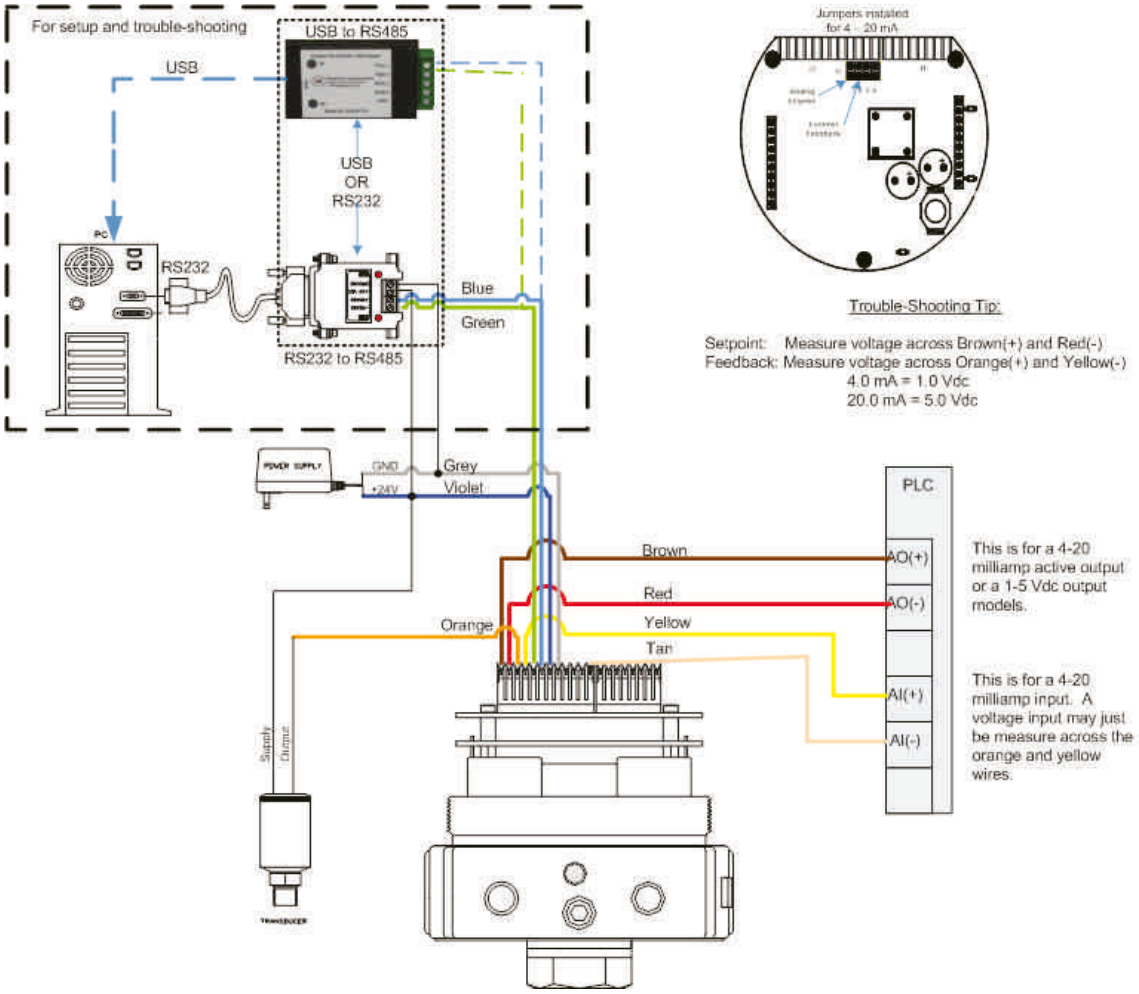
ER3000 Tuning

- In many applications, the standard factory settings will work satisfactorily, but to get the best performance, "tuning" of the control loop parameters may be required (see chapter 8 and ER3000 user manual for detailed information). When tuning, use conditions similar to the final application (i.e. similar pressures, flow, and medium). A tuning procedure is provided in the ER3000 User Manual. There is also "Help" available in the Tune program itself, accessed by going to the Help menu or by pressing 'F1'. See Section 8 for further tuning tips.

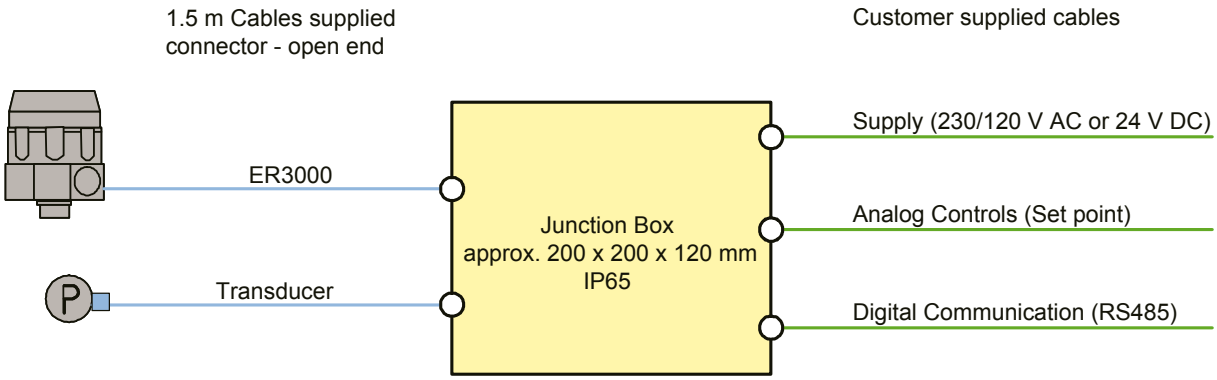
6 Wiring

6.1 General Wiring

The following diagram shows the typical electrical connection of the ER3000. You will find additional information in the ER3000 User Manual.

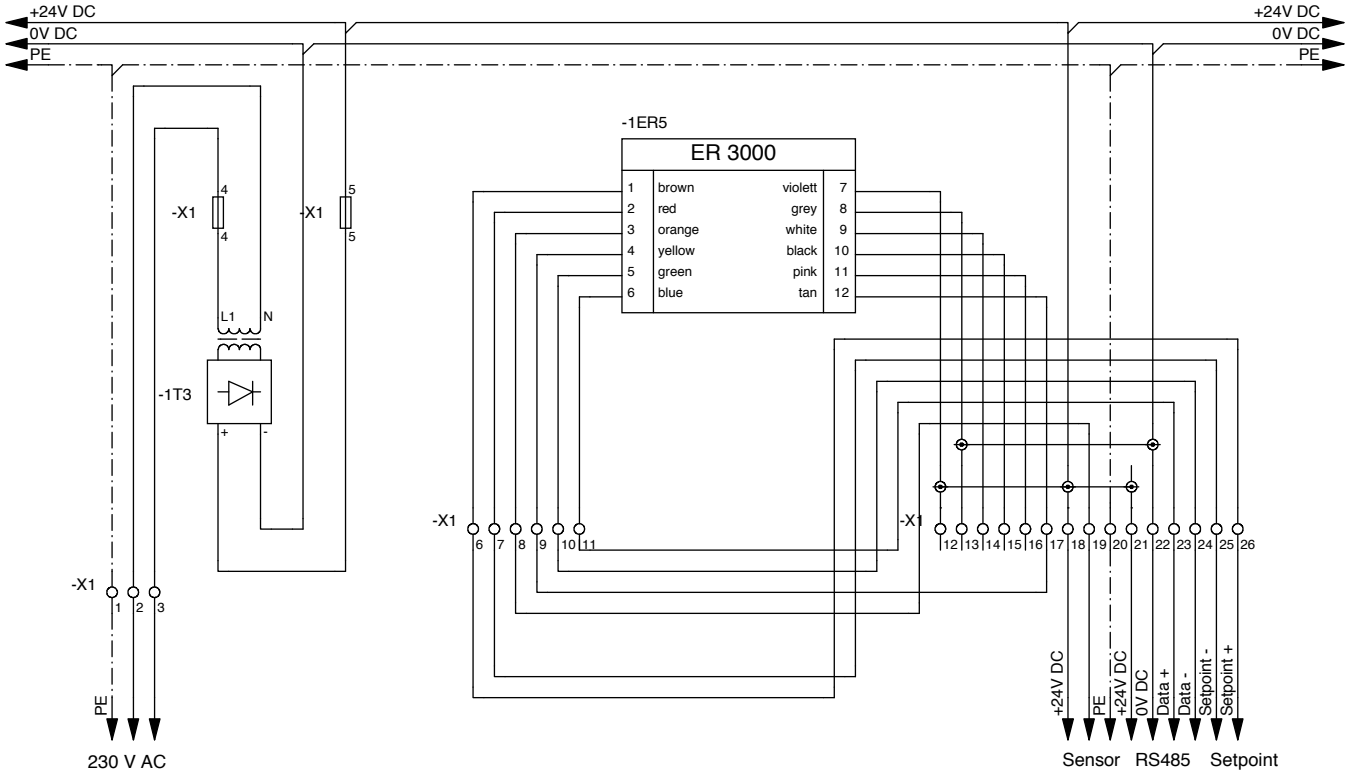


6.2 With Junction Box

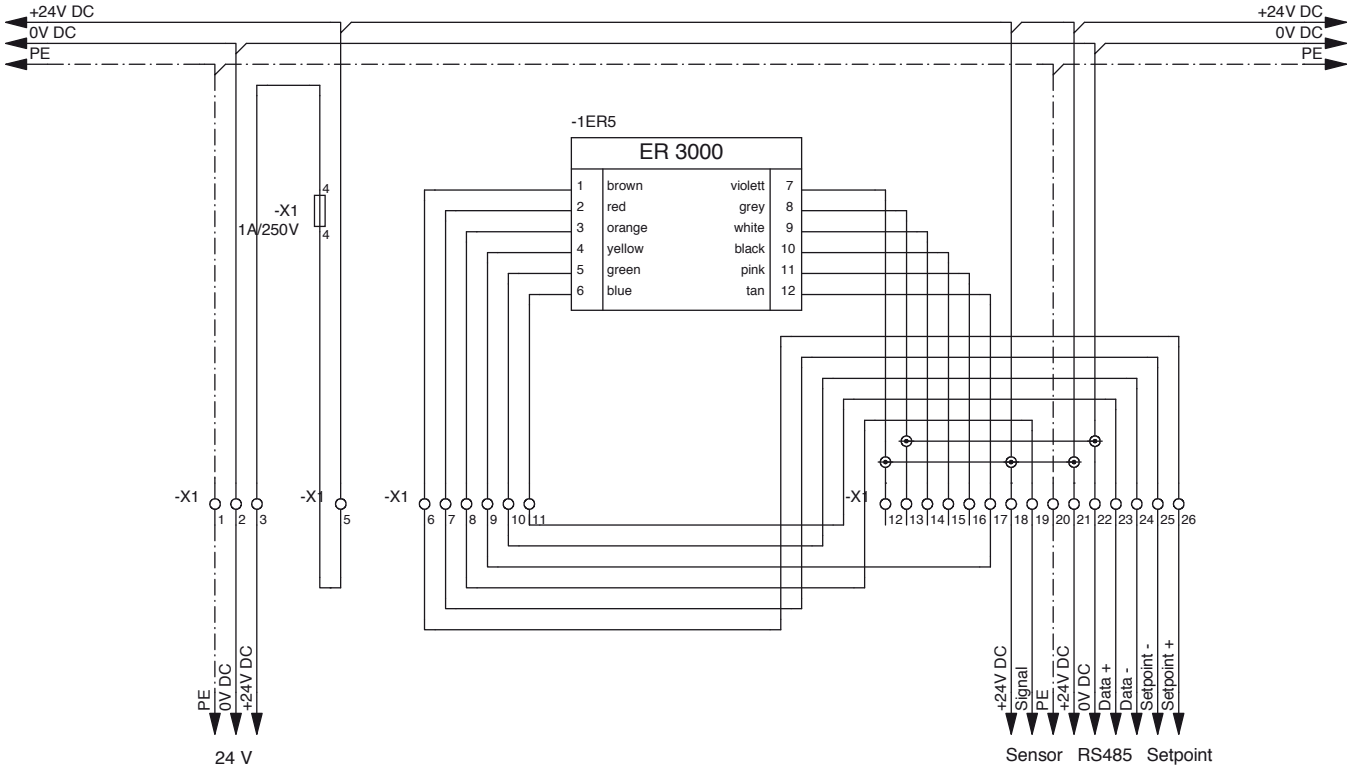


Junction Box Schematic

Junction Box AC



Junction Box DC



7 Maintenance

The maintenance and repair of pressure equipment must only be performed by trained experts!

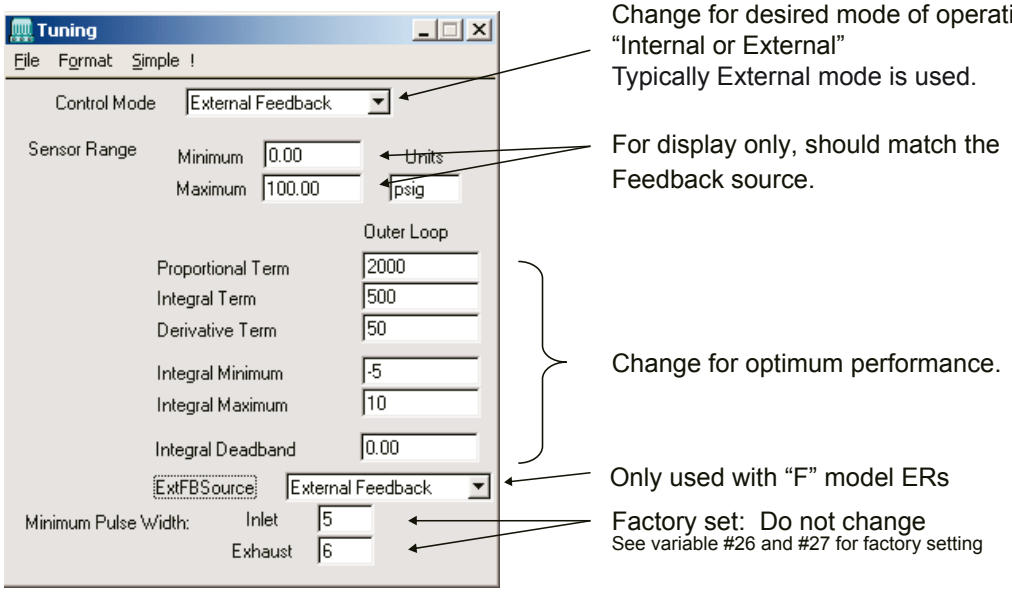
Since every application exists under different conditions, the user is responsible for establishing a maintenance program based on their unique situation. Until enough data is collected to set up a schedule, we recommend a 6 - 12 month check of the following:

1. Visual check for damages, especial of the tubing, electrical components and cables
2. Functional check
3. Check for leaks

A periodic calibration of the feedback pressure transducer depends on the user's requirements. Tescom recommends a yearly calibration.

8 Tuning ER3000

If additional tuning is desired, the ER3000 Windows Tune program is provided on the CD included in the ER kit package. See Sections 8.1 and 8.2 for general PID control information



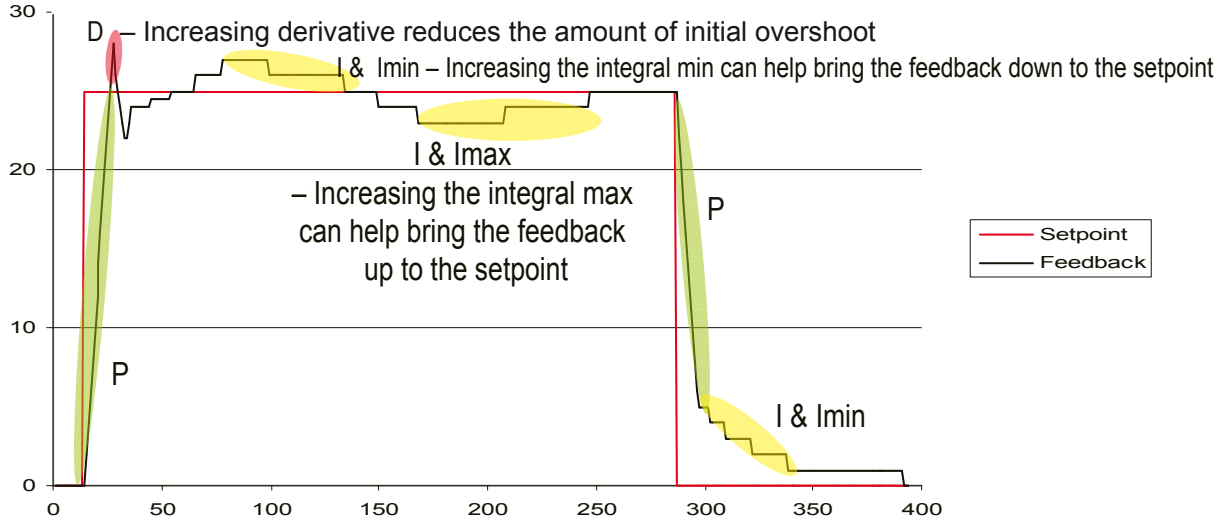
Proportional (P): Right foot on gas pedal, the harder you press the faster you go.

Derivative (D): Left foot on the brake pedal, the harder you press the faster you stop.

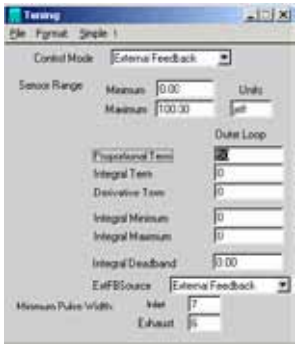
Integral (I): Back seat driver, the bigger the number the louder they are shouting for you to correct your driving.

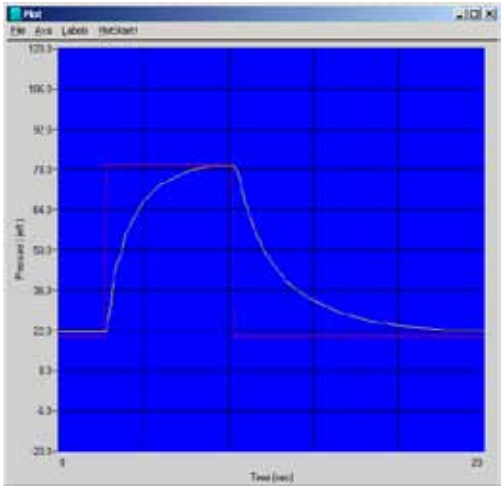
Integral Min: Back seat driver, the more negative the number the longer they are shouting that you are beyond your setpoint. Correction will be down to the target.

Integral Max: Back seat driver, the bigger the number the longer they are shouting that you are not at your setpoint. Correction will be up to the target.

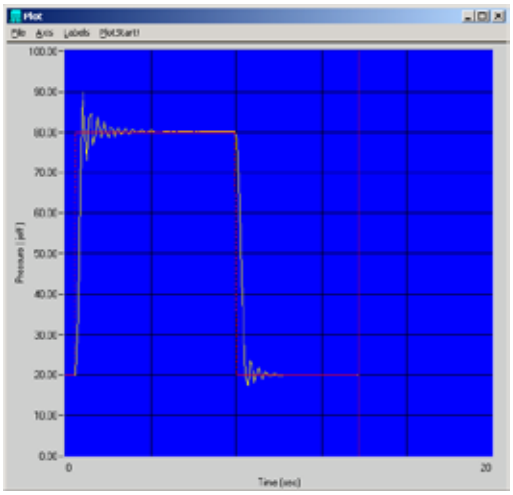


Typical tuning sequence: increase Proportional for faster response.
Typical Range: 500 to 3000

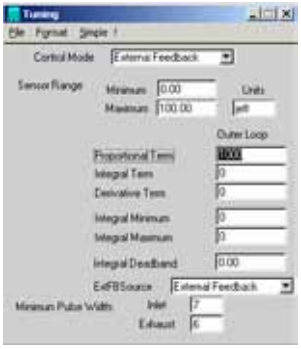


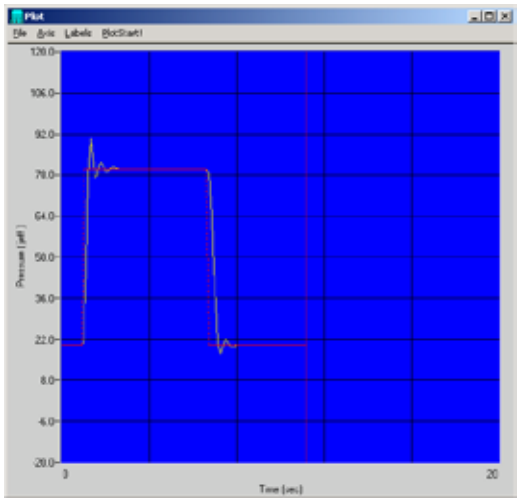


Too much Proportional will make unstable.

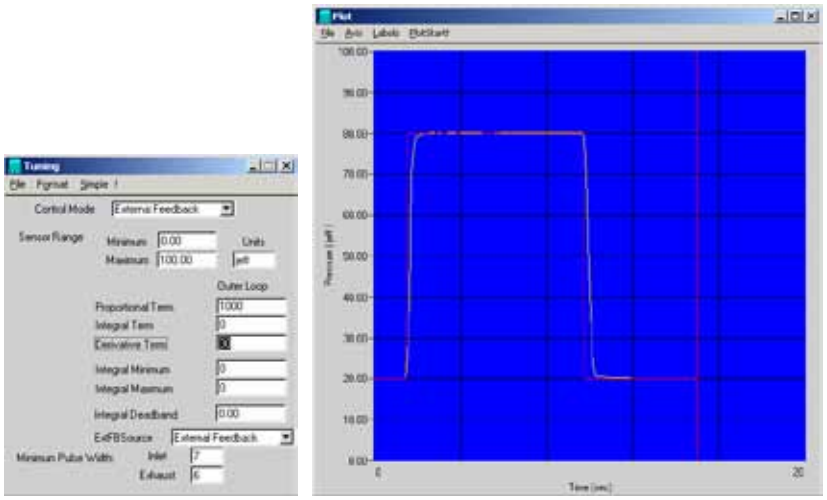


Optimal Proportional with little ringing.

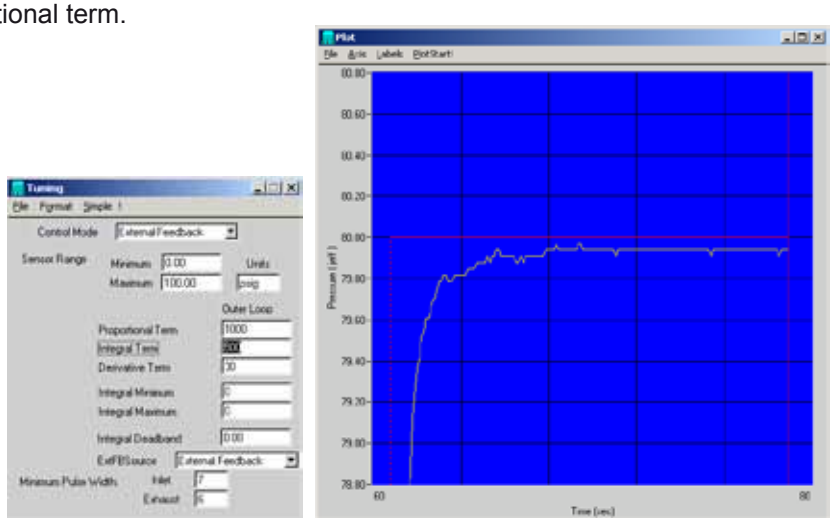




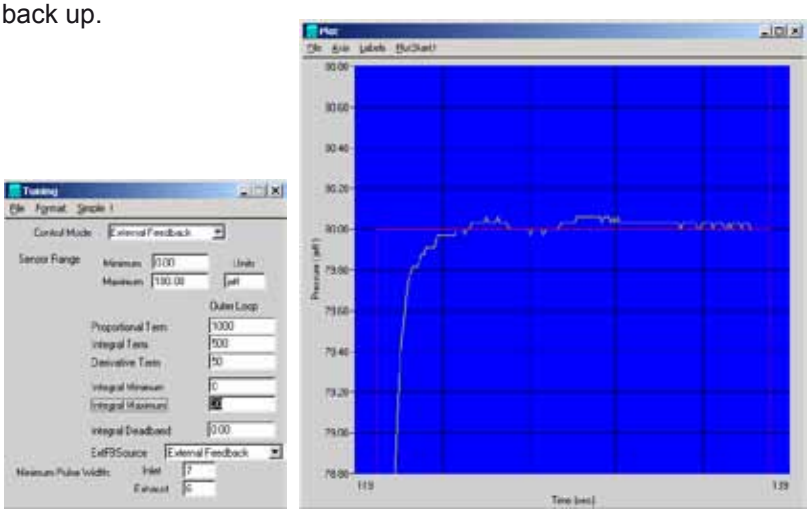
Increase Derivative to eliminate over-shoot.
Typical Range: 20 to 200



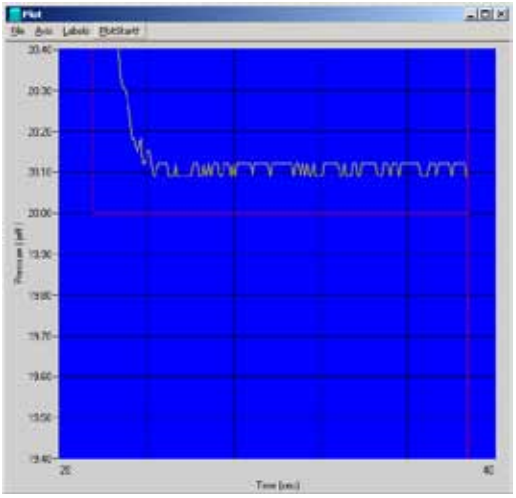
Zoom in to see accuracy.
Make Integral approximately 50% of proportional term.
Typical Range: 50% of P term down to zero



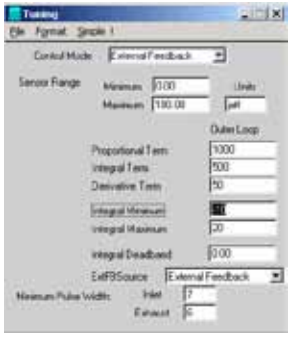
Increase Integral maximum to bring the feedback up.
Typical Range: 5 to 300
Has no effect if Integral term = 0

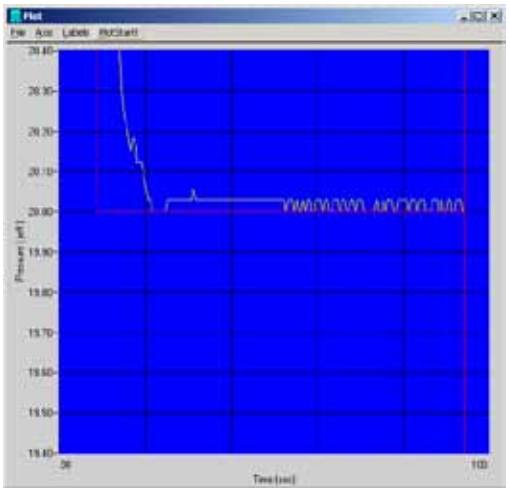


Zoom in on decreasing setpoint.

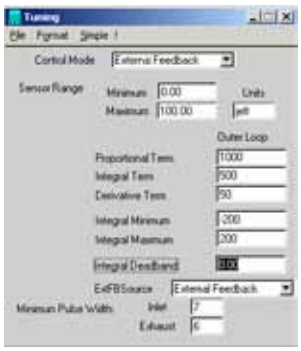


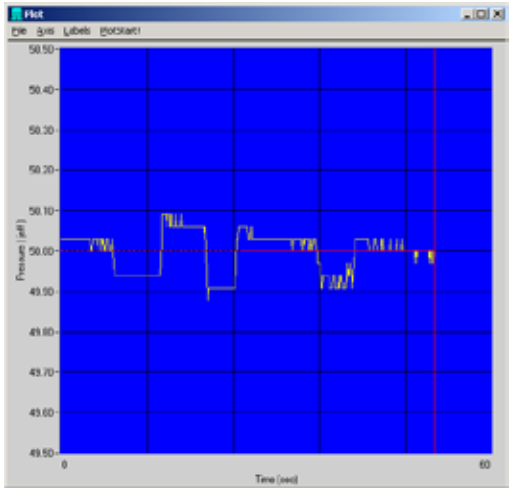
Make Integral Minimum more negative to bring the feedback down to setpoint.
Typical Range: -5 to –300
Has no effect if Integral term = 0



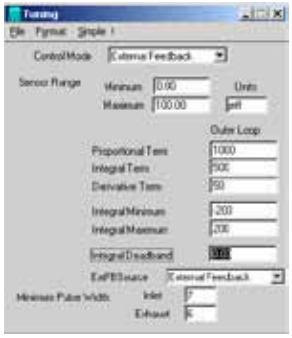


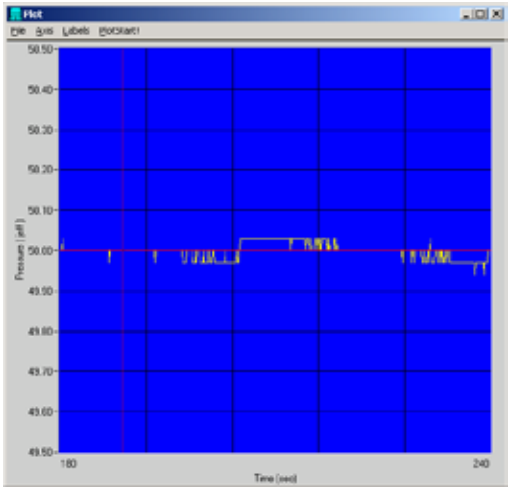
Too much integral may cause oscillations.



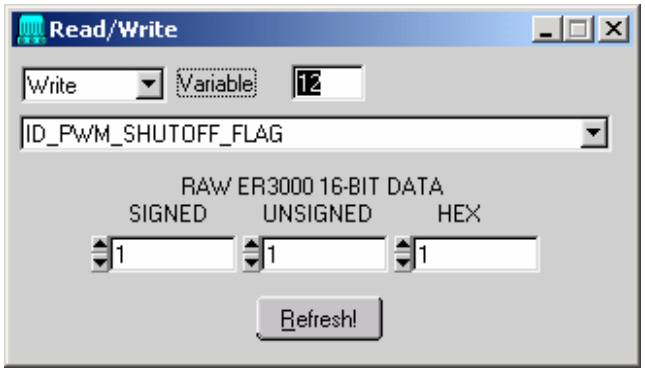


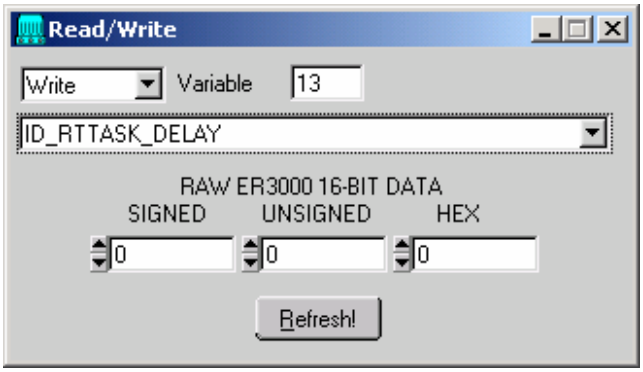
Adding Integral Dead band may remove oscillation.
Typical Range: 0.03 to 0.5



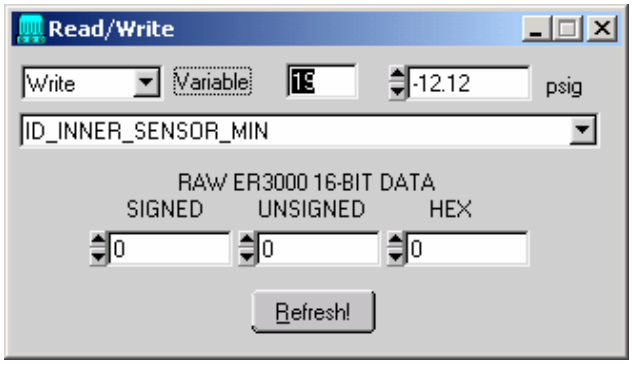


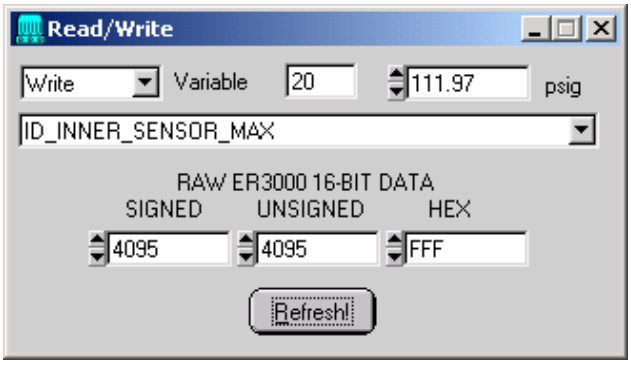
Another way to remove oscillations:
• Change Frequency Response of ER3000
• Change variable 12 to a “0”.
• Increase variable 13 to delay in increments of 25 milliseconds. (“0”=25 ms, 1=25 ms, 2=50 ms….)





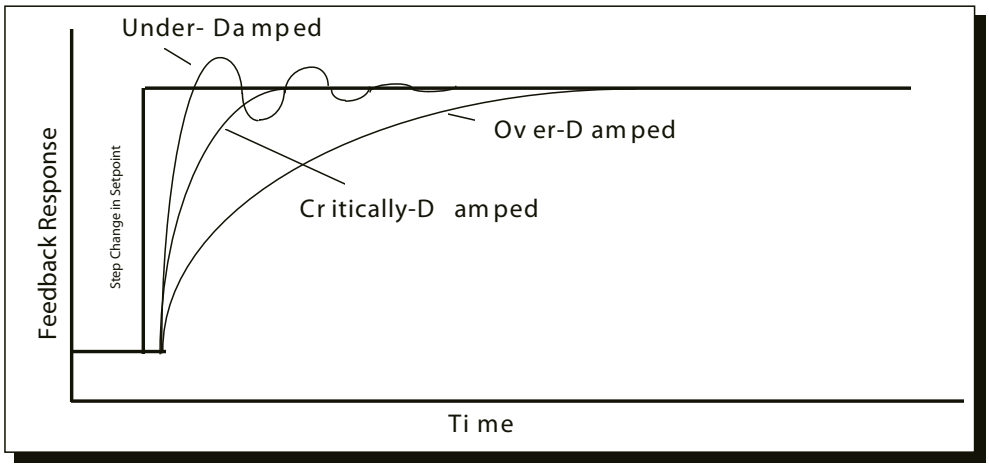
Firmware Version 716
Limit Internal Sensor:
• Variable 20 limits maximum
• Variable 19 limits minimum





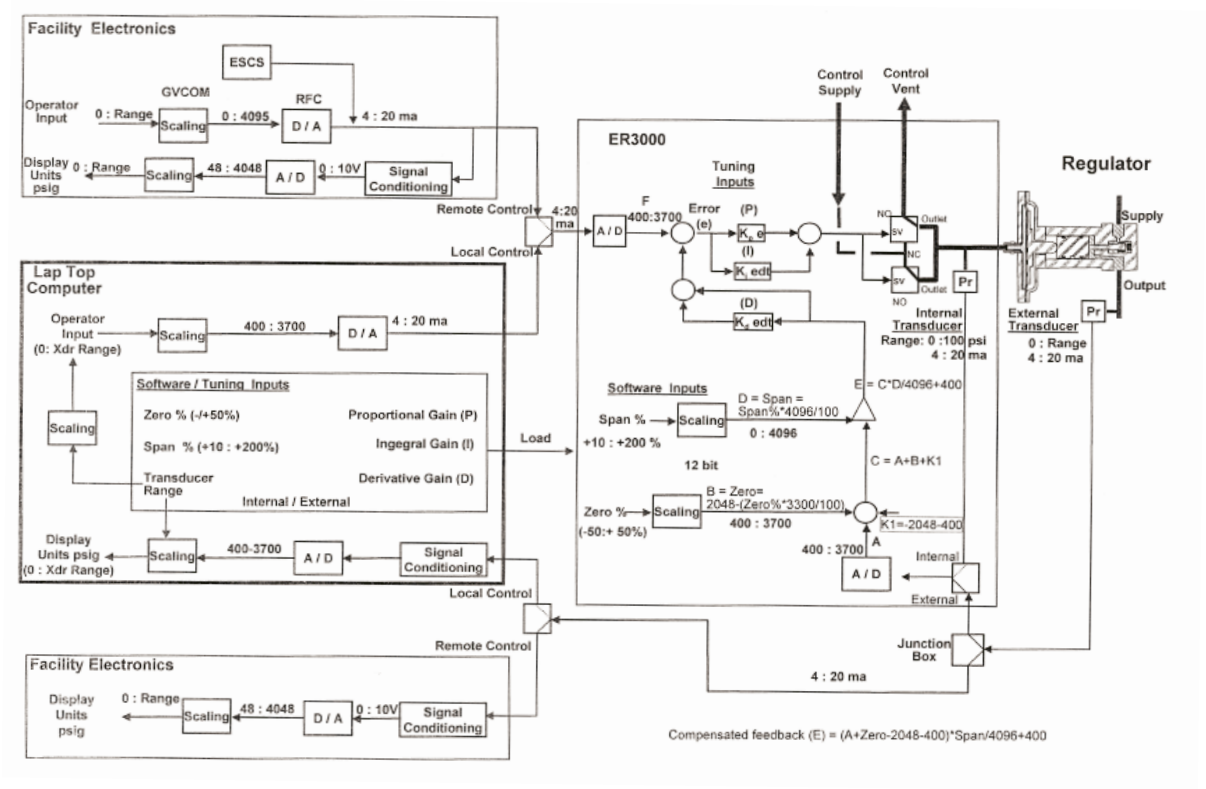
8.1 **PID Control** -System Response to a Step Change in Setpoint

- Optimal PID parameters result in a “Critically-Damped” response
- Not enough “gain” results in an “Over-Damped” response
- Too much “gain” results in an “Under-Damped” response

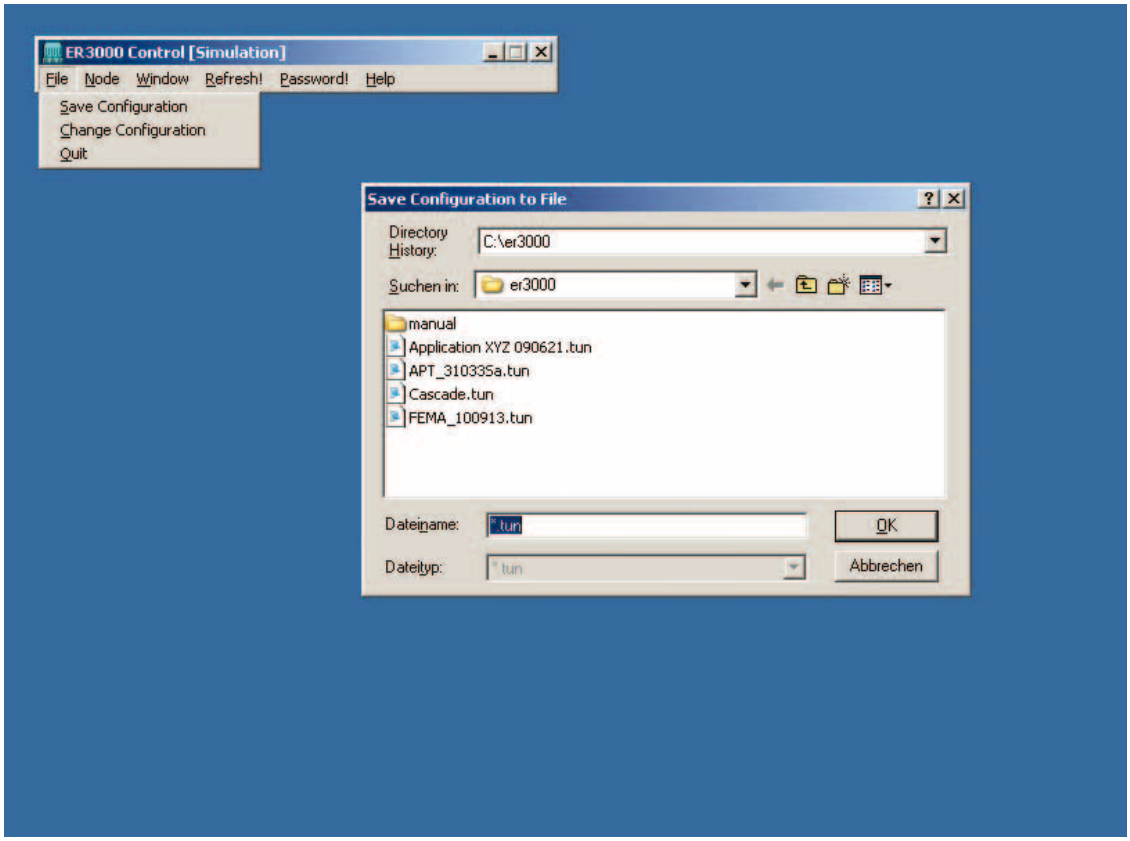


8.2 PID Control

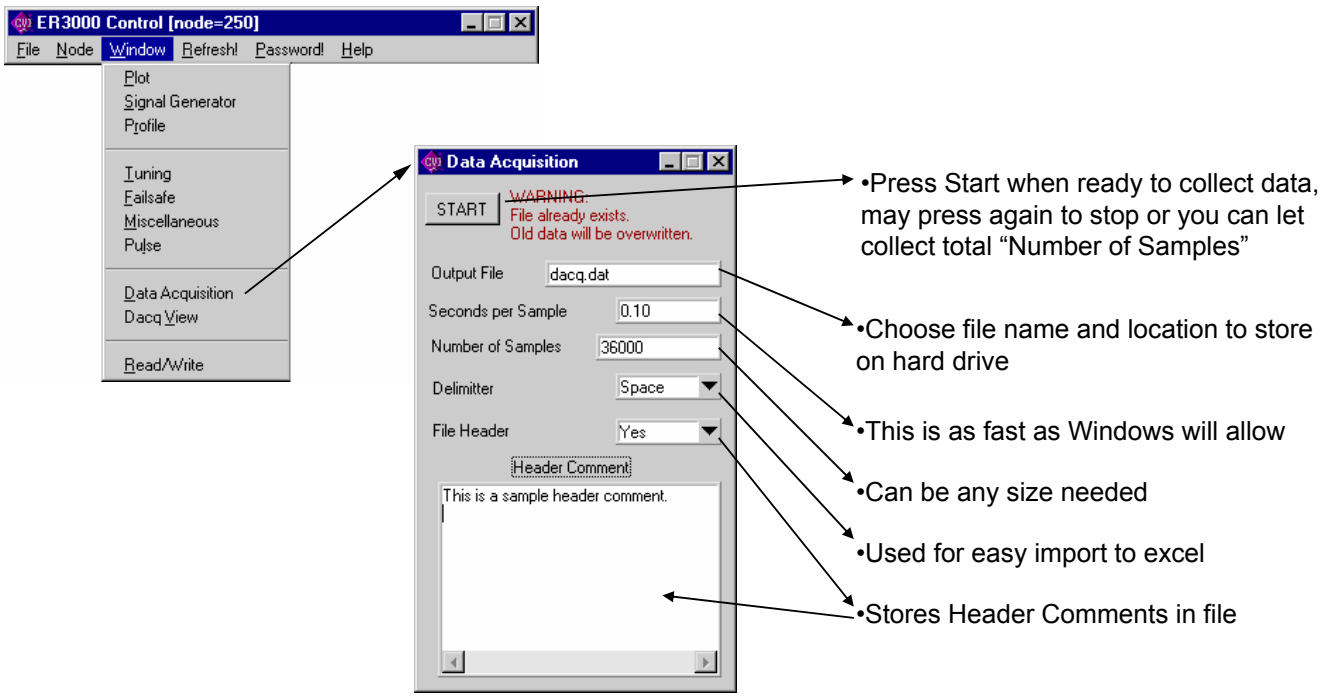
Math Model



8.3 Saving Data - PID Configuration



8.4 Data Acquisition

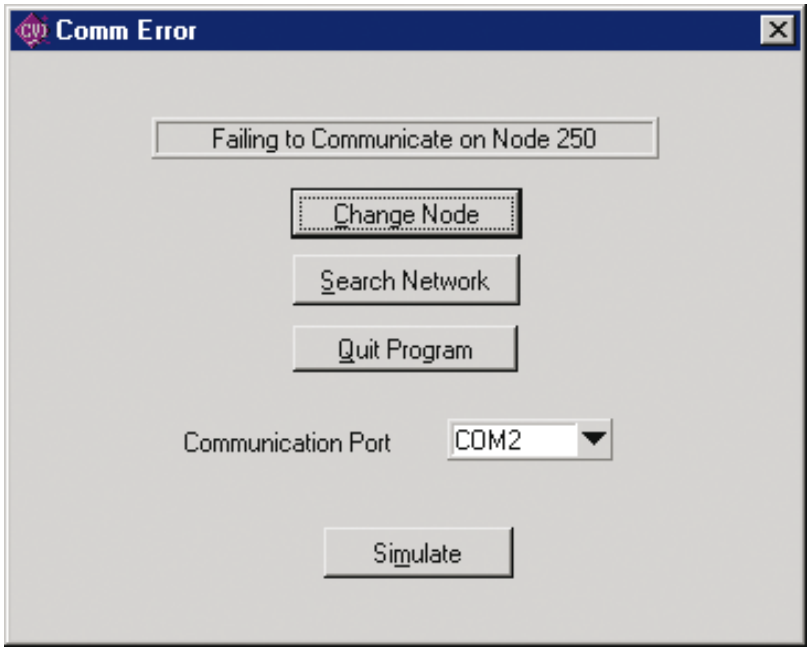


9 ER 3000 Troubleshooting

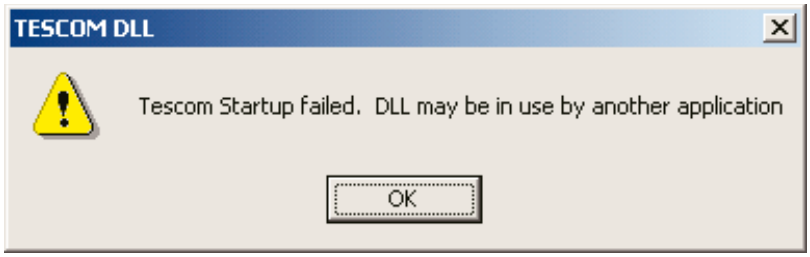
9.1 System Troubleshooting

Communications

Check LED's on RS485 converter and ER3000 circuit boards.



DLL in use error is related to com port access.
Try another Com port.



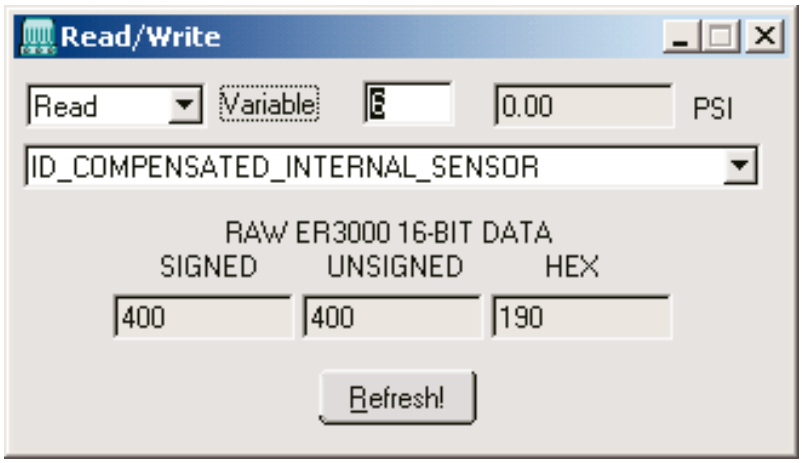
Pressure

Read/write windows can be used to monitor a digital display of the system pressures.

Variable #1 is the analog setpoint.
1 Vdc or 4 mA is equal to 400 counts. 5 Vdc or 20 mA is equal to 3700 counts.

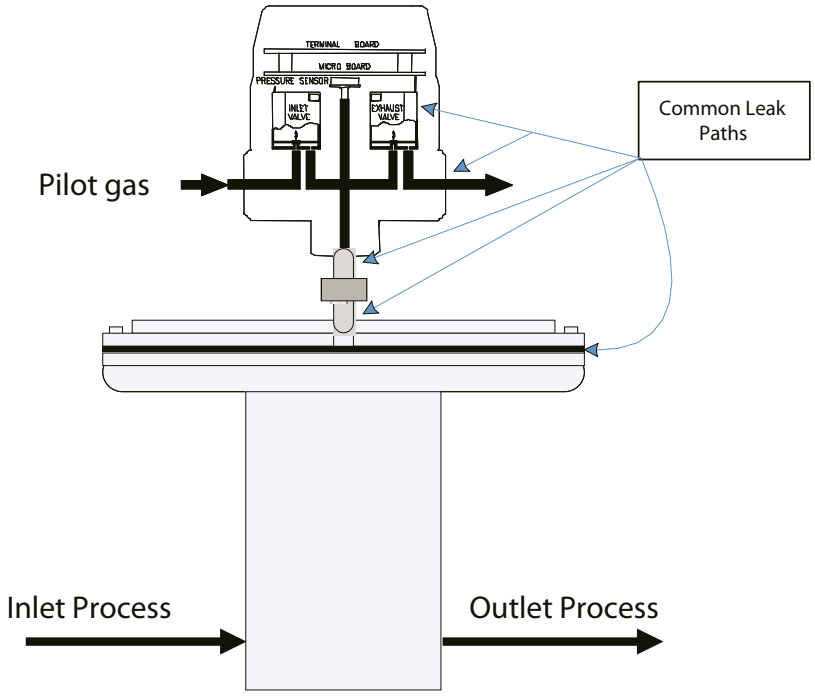
Variable #5 is the external feedback.
1 Vdc or 4 mA is equal to 400 counts. 5 Vdc or 20 mA is equal to 3700 counts.

Variable #6 is the internal feedback.
400 counts is equal to 0 psi. 3700 counts is equal to 100 psi.



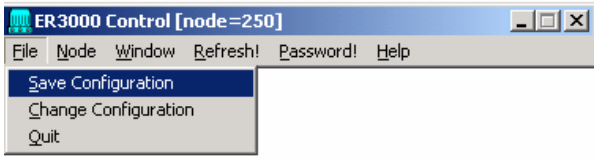
9.2 Leak Paths

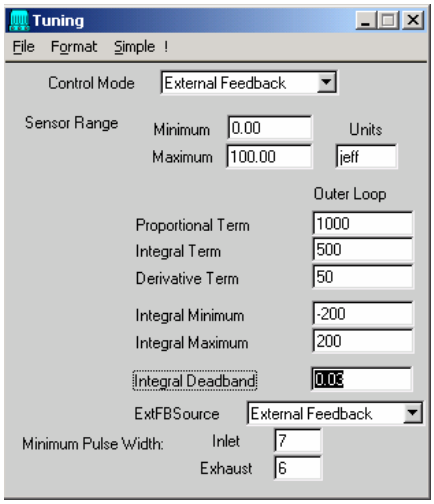
Pressure oscillations are often caused by leaks in the system. Common leak paths are shown below. Use the following leak check procedure to find and eliminate all leaks.



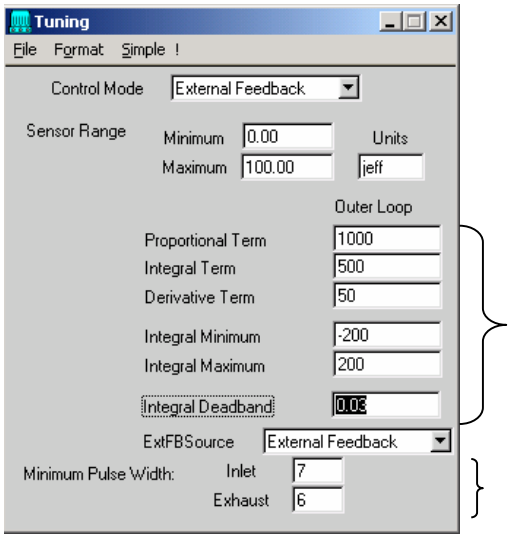
Leak Check

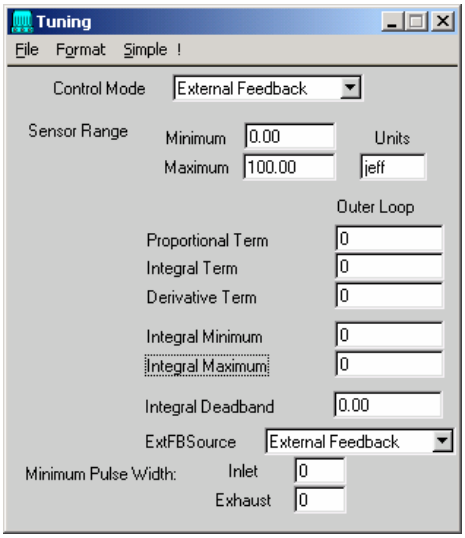
Save current parameters



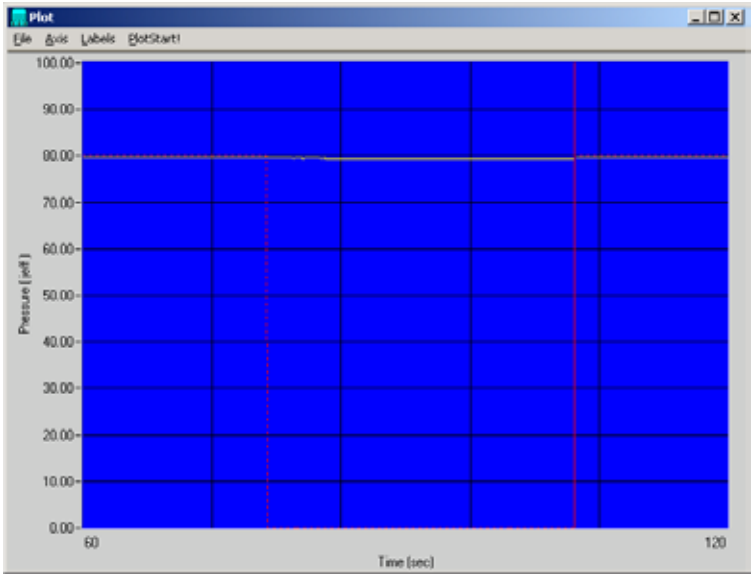


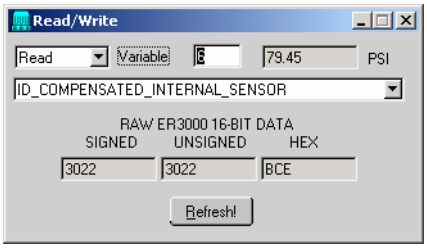
Change PID values to “0”



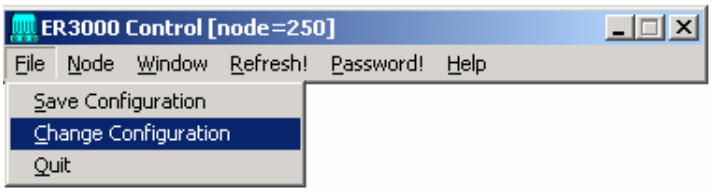


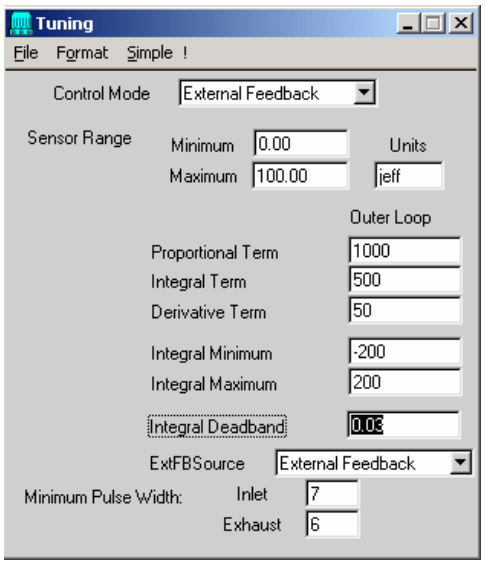
Internal pressure should not decay more then 0.1 psig in 20 seconds.





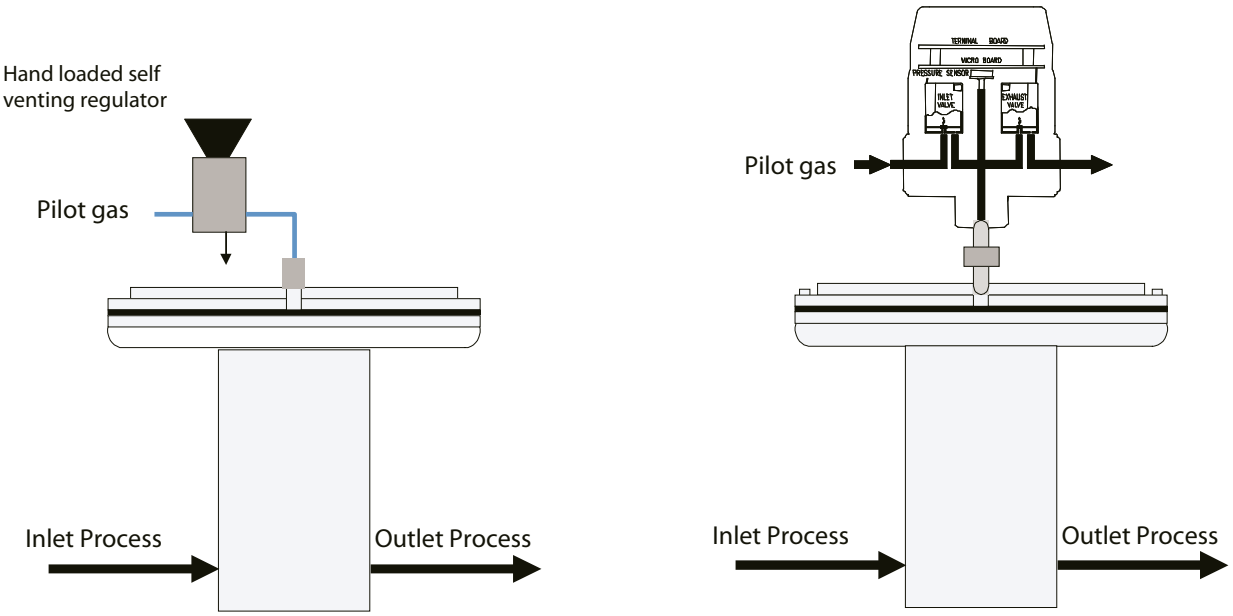
Restore PID parameters





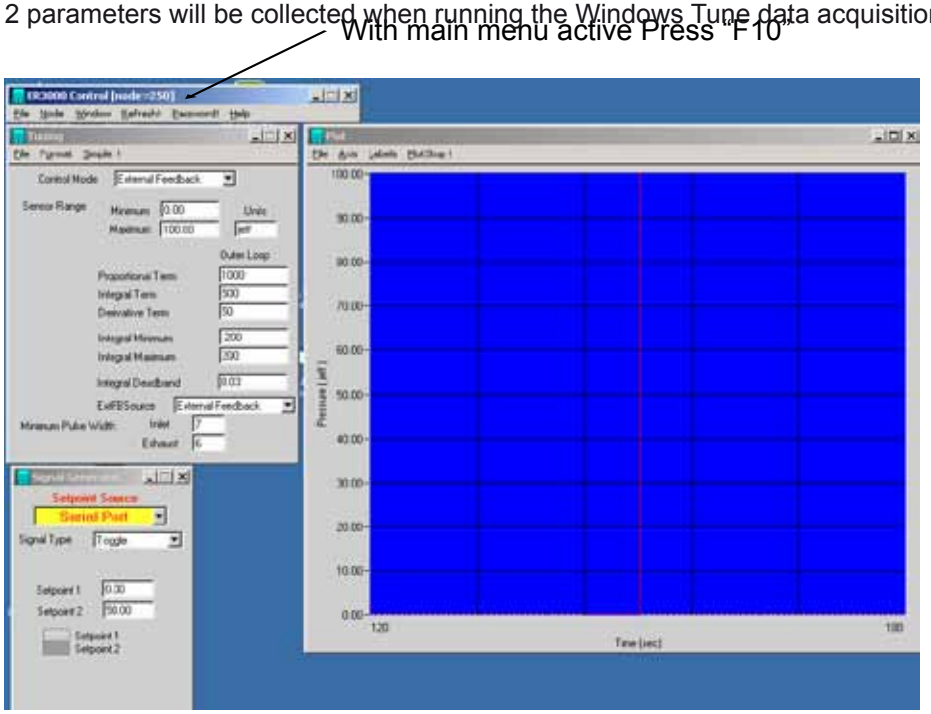
9.3 Isolate Mechanical from electrical

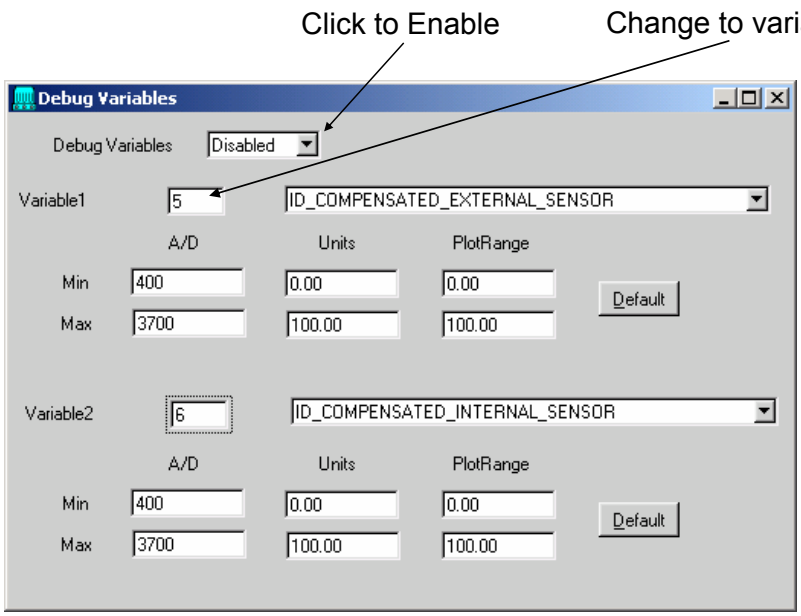
To ensure that the regulator is working properly, test if using one of the methods shown below. With the ER3000 in internal feedback mode, both systems will perform the same.

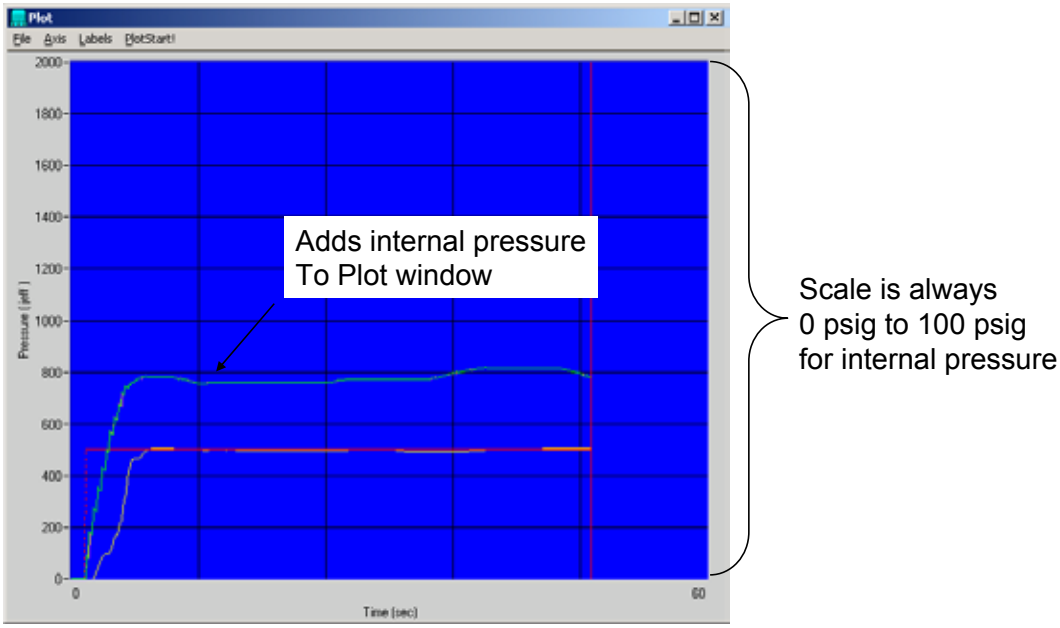


9.4 Debug Window

By enabling the debug variable, 2 extra parameters can be monitored on the plot screen. In addition, data on these 2 parameters will be collected when running the Windows Tune data acquisition routine.



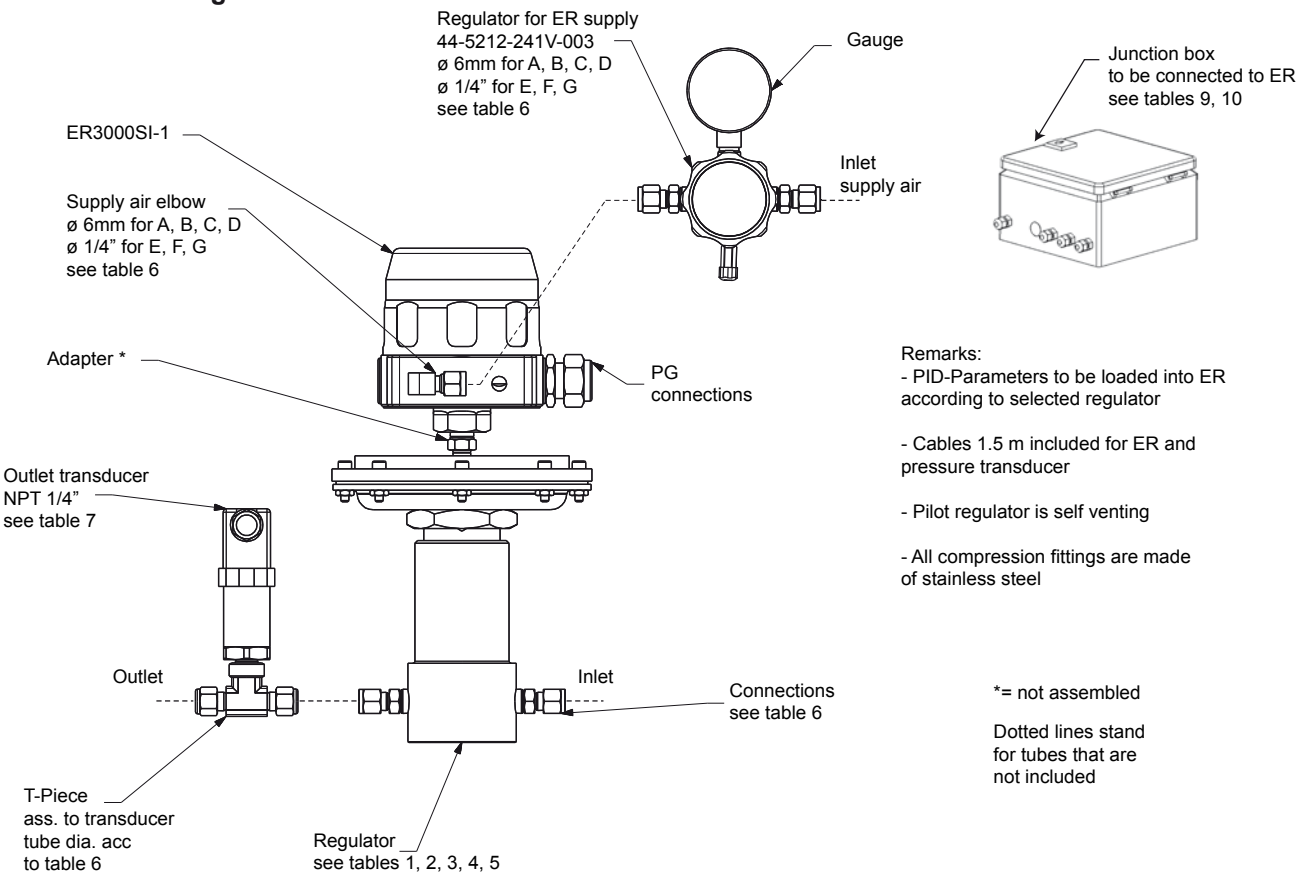

Click to Enable
Change to variable “6”
Debug Variables
Debug Variables
Disabled
Variable1
5
ID_COMPENSATED_EXTERNAL_SENSOR
A/D
Units
PlotRange
Min
400
0.00
0.00
Default
Max
3700
100.00
100.00
Variable2
6
ID_COMPENSATED_INTERNAL_SENSOR
A/D
Units
PlotRange
Min
400
0.00
0.00
Default
Max
3700
100.00
100.00


Plot
File Axis Labels PlotStart!
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Pressure (psiff)
0
60
Time (sec)
Adds internal pressure
To Plot window
Scale is always
0 psig to 100 psig
for internal pressure

10 Drawings

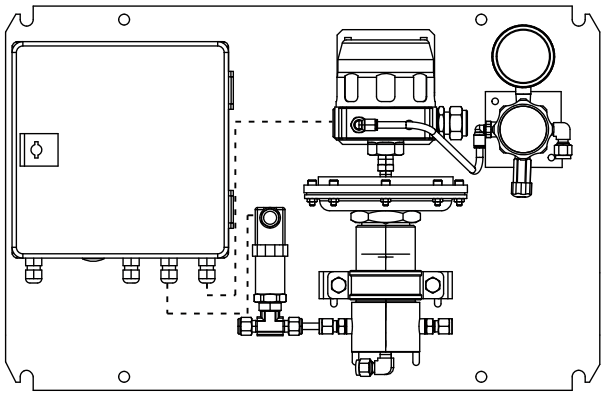
The drawings in this manual are for reference only. For most up to date drawings please contact your local TESCOM representative.

Pressure Reducing Version

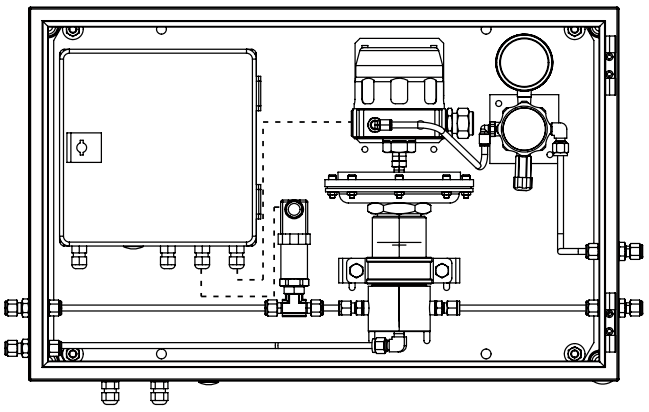


*: parts are not assembled in Kit 1

Kit assembled on plate



Kit in assembled enclosure



ER3000 Kit

ER3P-E6F7TA21D2

TABLE 1	
DASH NO.	KITS CATEGORY
P	UNASSEMBLED PARTS
L	PARTS ASSEMBLED ON PLATE
E	PARTS IN ASSEMBLED ENCOSURE

TABLE 2	
DASH NO.	BODY MATERIAL
1	BRASS
6	STAINLESS STEEL
Z	ZINC

TABLE 3	
DASH NO.	OUTLET PRESSURE RANGE
A	6 BAR Cv=1.5 FLOW BOOSTER
B	6 BAR Cv=2.2 FLOW BOOSTER
C	6 BAR Cv=0.35 DK DOME LOAD
D	40 BAR Cv=0.35 DK AIR LOAD
E	35 BAR Cv=0.15 44-52VA MOD027
F	100 BAR Cv=0.06 26-20 AIR LOAD
G	160 BAR Cv=0.06 26-20 AIR LOAD
H	400 BAR Cv=0.06 26-20 AIR LOAD
J	600 BAR Cv=0.06 26-20 AIR LOAD

TABLE 4	
DASH NO.	SEAL MATERIAL
0	CTFE
7	VESPEL SP1
8	PEEK
B	BUNA-N

TABLE 5	
DASH NO.	O-RING MATERIAL
D	BUNA (NBR)
T	VITON (FKM)
U	URETHANE (PUR)
V	KALREZ (FFKM)
Z	EP (EPDM)

TABLE 10	
DASH NO.	JUNCTION BOX COMMUNICATION
2	RS232-RS485 CONVERTER
U	USB-RS485 CONVERTER
0	NONE

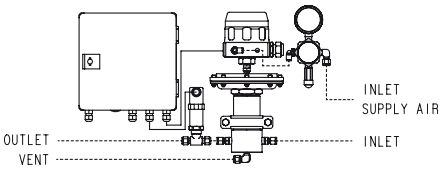
TABLE 9	
DASH NO.	JUNCTION BOX SUPPLY VOLTAGE
0	BOX NOT INCLUDED
A	AC (100-230V)
D	DC (24V)

TABLE 8	
DASH NO.	REGULATOR FOR ER SUPPLY (7 BAR)
0	NONE
1	44-5212-241V-002

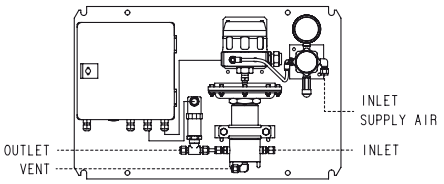
TABLE 7	
DASH NO.	OUTLET TRANSDUCER ACC. TO D51656
1	P10 (0.1% ACCURACY)
2	S10 (0.25% ACCURACY)
9	NONE

TABLE 6	
DASH NO.	PORTING/FITTING SIZE FOR INLET AND OUTLET, TUBING SIZE
A	Ø 6mm
B	Ø 8mm
C	Ø 10mm
D	Ø 12mm
E	Ø 1/4"
F	Ø 3/8"
G	Ø 1/2"

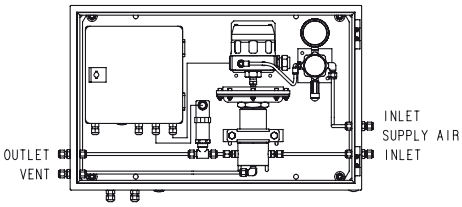
KITS FOR ER3000 PRESSURE REDUCING



KITS FOR ER3P-PXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 2



KITS FOR ER3P-LXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 3



KITS FOR ER3P-EXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 4

Available Combinations (SELECTION CHART)

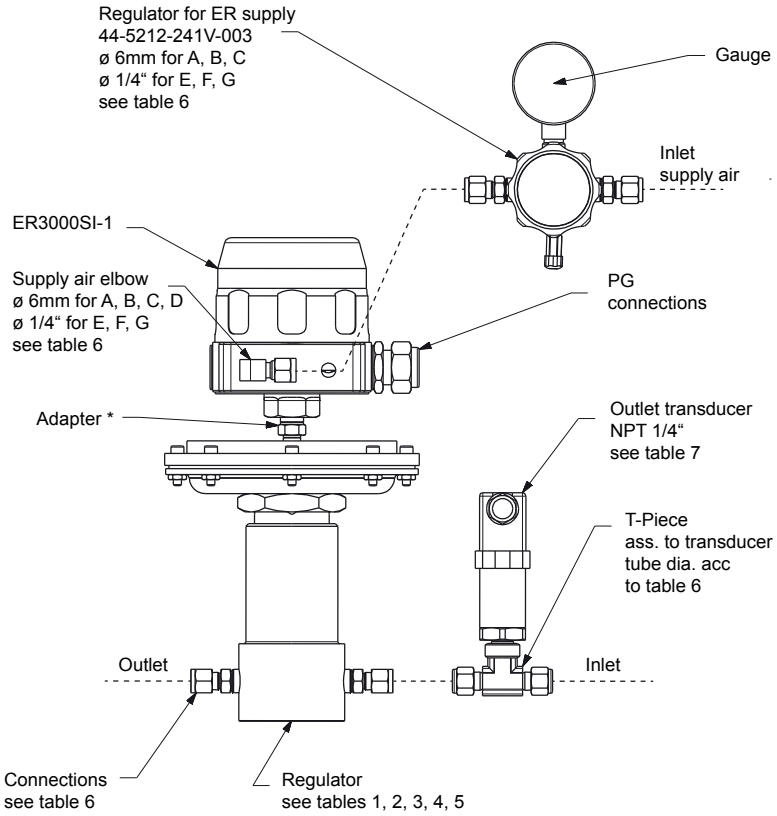
REGULATOR				BODY			SEAT				O-RING					INLET & OUTLET COMPRESSION FITTINGS						
REGULATOR SERIES	PRESSURE RANGE PSIG / BAR	MAX. INLET PRESSURE PSIG / BAR	Cv	1 – Brass	6 – SST	Z – Zinc	0 – CTFE	7 – Vespel®	8 – PEEK	B – Buna-N®	D – Buna-N®	T – Viton®	U – Urethane	V – Kalrez®	Z – EP	A – ø6 mm	B – ø8 mm	C – ø10 mm	D – ø12 mm	E – 1/4"	F – 3/8"	G – 1/2"
A: Flow Booster	87 / 6	300 / 20	1.5	n	n	+	n	n	n	+	+	n	n	n	n	+	+	+	+	+	+	+
B: Flow Booster	87 / 6	300 / 20	2.5	n	n	+	n	n	n	+	+	n	n	n	n	n	n	+	+	n	+	+
C: DK Dome Loaded	87 / 6	1000 / 7	0.35	+	+	n	+	n	+	n	+	+	n	n	+	+	+	+	+	+	+	+
D: DK Air Loaded	580 / 40	1000 / 7	0.35	+	+	n	+	n	+	n	+	+	n	n	+	+	+	+	+	+	+	+
E: 44-52V Air Loaded	580 / 40	3500 / 240	0.15	+	+	n	n	+	n	n	n	+	n	n	n	+	+	n	n	+	n	n
F: 26-20 Air Loaded	1450 / 100	15000 / 1035	0.06	+	+	n	n	+	+	n	+	+	+	+	+	+	+	+	+	+	+	+
G: 26-20 Air Loaded	2320 / 160	15000 / 1035	0.06	+	+	n	n	+	+	n	+	+	+	+	+	+	+	+	+	+	+	+
H: 26-20 Air Loaded	5800 / 400	15000 / 1035	0.06	+	+	n	n	+	+	n	+	+	+	+	+	+	+	+	+	+	+	+
J: 26-20 Air Loaded	8700 / 600	15000 /1035	0.06	+	+	n	n	+	+	n	+	+	+	+	+	+	+	+	+	+	+	+

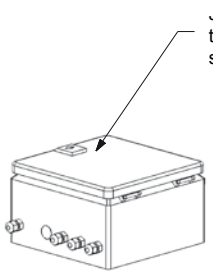
+ available

n not available

ER3000 Kit

Back Pressure Version





Remarks:
- PID-Parameters to be loaded into ER according to selected regulator

- Cables 1.5 m included for ER and pressure transducer

- Pilot regulator is self venting

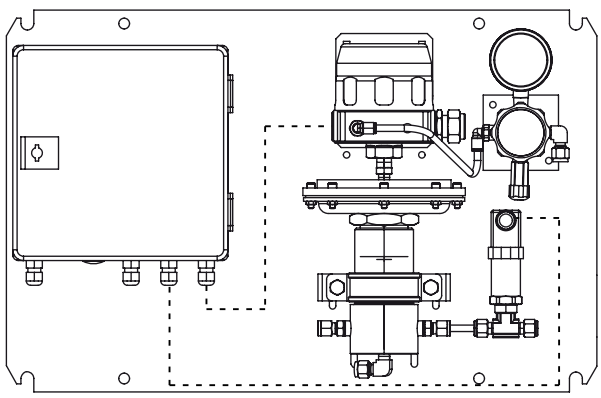
- All compression fittings are made of stainless steel

*= not assembled

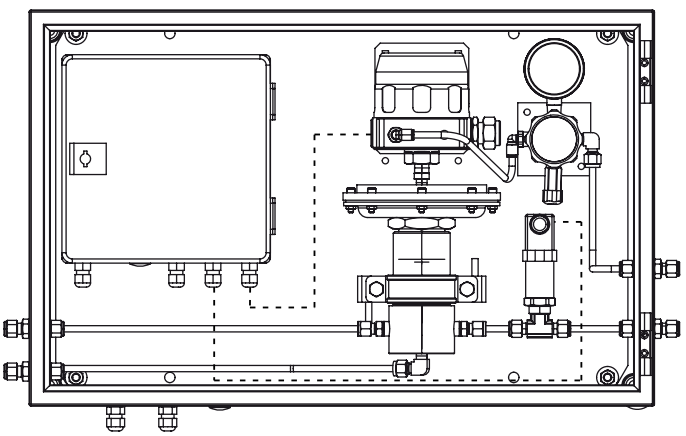
Dotted lines stand for tubes that are not included

*: parts are not assembled in Kit 1

Kit assembled on plate



Kit in assembled enclosure



ER3B-E6F0DA21D2

TABLE 1	
DASH NO.	KITS CATEGORY
P	UNASSEMBLED PARTS
L	PARTS ASSEMBLED ON PLATE
E	PARTS IN ASSEMBLED ENCOSURE

TABLE 2	
DASH NO.	BODY MATERIAL
6	STAINLESS STEEL

TABLE 3	
DASH NO.	OUTLET PRESSURE RANGE
A	100BAR Cv=0.08 54-21 AIR LOAD
B	160BAR Cv=0.08 54-21 AIR LOAD
C	400BAR Cv=0.08 54-21 AIR LOAD
D	600BAR Cv=0.08 54-21 AIR LOAD
F	100 BAR Cv=0.14 26-17 AIR LOAD
G	160 BAR Cv=0.1 26-17 AIR LOAD
H	400 BAR Cv=0.1 26-17 AIR LOAD
J	600 BAR Cv=0.1 26-17 AIR LOAD

TABLE 4	
DASH NO.	SEAL MATERIAL
0	CTFE
3	TEFLON (PTFE)
7	VESPEL SP1

TABLE 5	
DASH NO.	O-RING MATERIAL
D	BUNA (NBR)
T	VITON (FKM)
U	URETHANE (PUR)
V	KALREZ (FFKM)
Z	EP (EPDM)

TABLE 10	
DASH NO.	JUNCTION BOX COMMUNICATION
2	RS232-RS485 CONVERTER
U	USB-RS485 CONVERTER
0	NONE

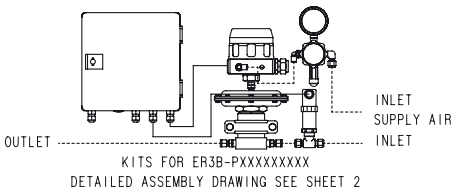
TABLE 9	
DASH NO.	JUNCTION BOX SUPPLY VOLTAGE
0	BOX NOT INCLUDED
A	AC (100-230V)
D	DC (24V)

TABLE 8	
DASH NO.	REGULATOR FOR ER SUPPLY (7 BAR)
0	NONE
1	44-5212-241V-002

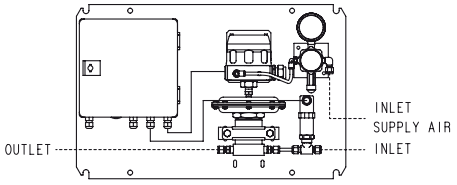
TABLE 7	
DASH NO.	OUTLET TRANSDUCER ACC. TO D51656
1	P10 (0.1% ACCURACY)
2	S10 (0.25% ACCURACY)
9	NONE

TABLE 6	
DASH NO.	PORTING/FITTING SIZE FOR INLET AND OUTLET, TUBING SIZE
A	Ø 6mm
B	Ø 8mm
C	Ø 10mm
D	Ø 12mm
E	Ø 1/4"
F	Ø 3/8"
G	Ø 1/2"

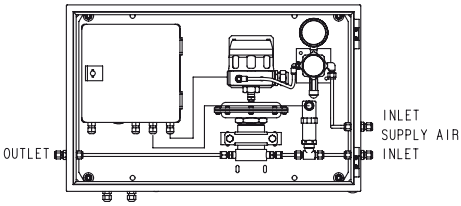
KITS FOR ER3000 BACK PRESSURE



KITS FOR ER3B-PXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 2



KITS FOR ER3B-LXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 3



KITS FOR ER3B-EXXXXXXXXX
DETAILED ASSEMBLY DRAWING SEE SHEET 4

Available Combinations (SELECTION CHART)

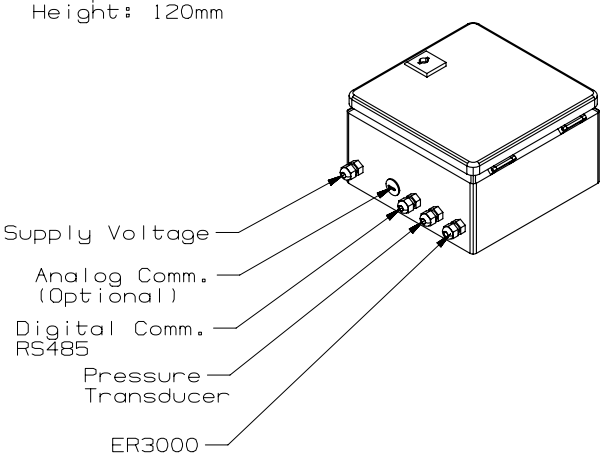
REGULATOR				BODY	SEAT			O-RING					INLET & OUTLET COMPRESSION FITTINGS						
REGULATOR SERIES	PRESSURE RANGE PSIG / BAR	MAX. INLET PRESSURE PSIG / BAR	Cv	6 – SST	0 – CTFE	3 – Teflon®	7 – Vespel®	D – Buna-N®	T – Viton®	U – Urethane	V – Kalrez®	Z – EP	A – ø6 mm	B – ø8 mm	C – ø10 mm	D – ø12 mm	E – 1/4"	F – 3/8"	G – 1/2"
A: 54-2100 Air Loaded	1450 / 100	1000 / 690	0.08	+	n	n	+	+	+	+	+	+	+	+	+	+	+	+	+
B: 54-2100 Air Loaded	2320 / 160	1000 / 690	0.08	+	n	n	+	+	+	+	+	+	+	+	+	+	+	+	+
C: 54-2100 Air Loaded	5800 / 400	1000 / 690	0.08	+	n	n	+	+	+	+	+	+	+	+	+	+	+	+	+
D: 54-2100 Air Loaded	8700 / 600	1000 / 690	0.08	+	n	n	+	+	+	+	+	+	+	+	+	+	+	+	+
F: 26-1700 Air Loaded	1450 / 100	1000 / 690	0.14	+	n	+	+	+	+	n	n	n	+	+	+	+	+	+	+
G: 26-1700 Air Loaded	2320 / 160	1000 / 690	0.1	+	+	n	+	+	+	n	n	n	+	+	+	+	+	+	+
H: 26-1700 Air Loaded	5800 / 400	1000 / 690	0.1	+	+	n	+	+	+	n	n	n	+	+	+	+	+	+	+
J: 26-1700 Air Loaded	8700 / 600	1000 / 690	0.1	+	+	n	+	+	+	n	n	n	+	+	+	+	+	+	+

+ available

n not available

Junction Box

Footprint: 200mm x 200mm
Height: 120mm



ER3JB-XXX

TABLE 3	
DASH NO.	COMMUNICATION
2	RS232 *
4	RS485
U	USB *

TABLE 2	
DASH NO.	HOUSING
O	WITHOUT HOUSING
H	WITH HOUSING

TABLE 1	
DASH NO.	SUPPLY VOLTAGE
A	AC 100V - 250V
D	DC 24V

REFER TO ASSY INFO D54053

* Converter RS485 to RS232 / USB enclosed, but not installed

UNLESS OTHERWISE SPECIFIED
TOLERANCE: ± _ ANGLES: ± _°
SURFACE FINISH: _ Ra
BREAK SHARP CORNERS: _ MAX
DO NOT SCALE THIS DWG ©

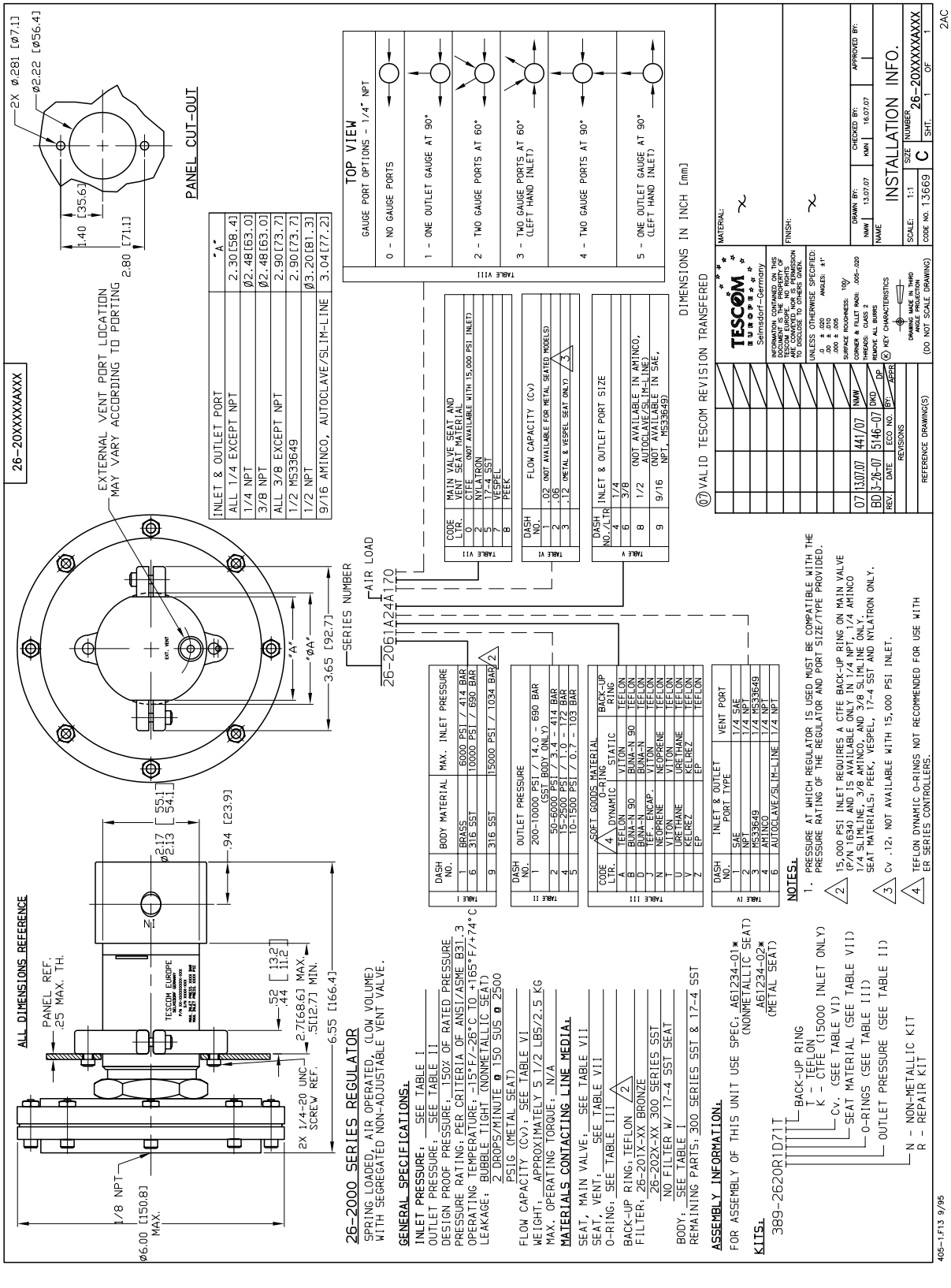
EMERSON Process Management

JUNCTION BOX

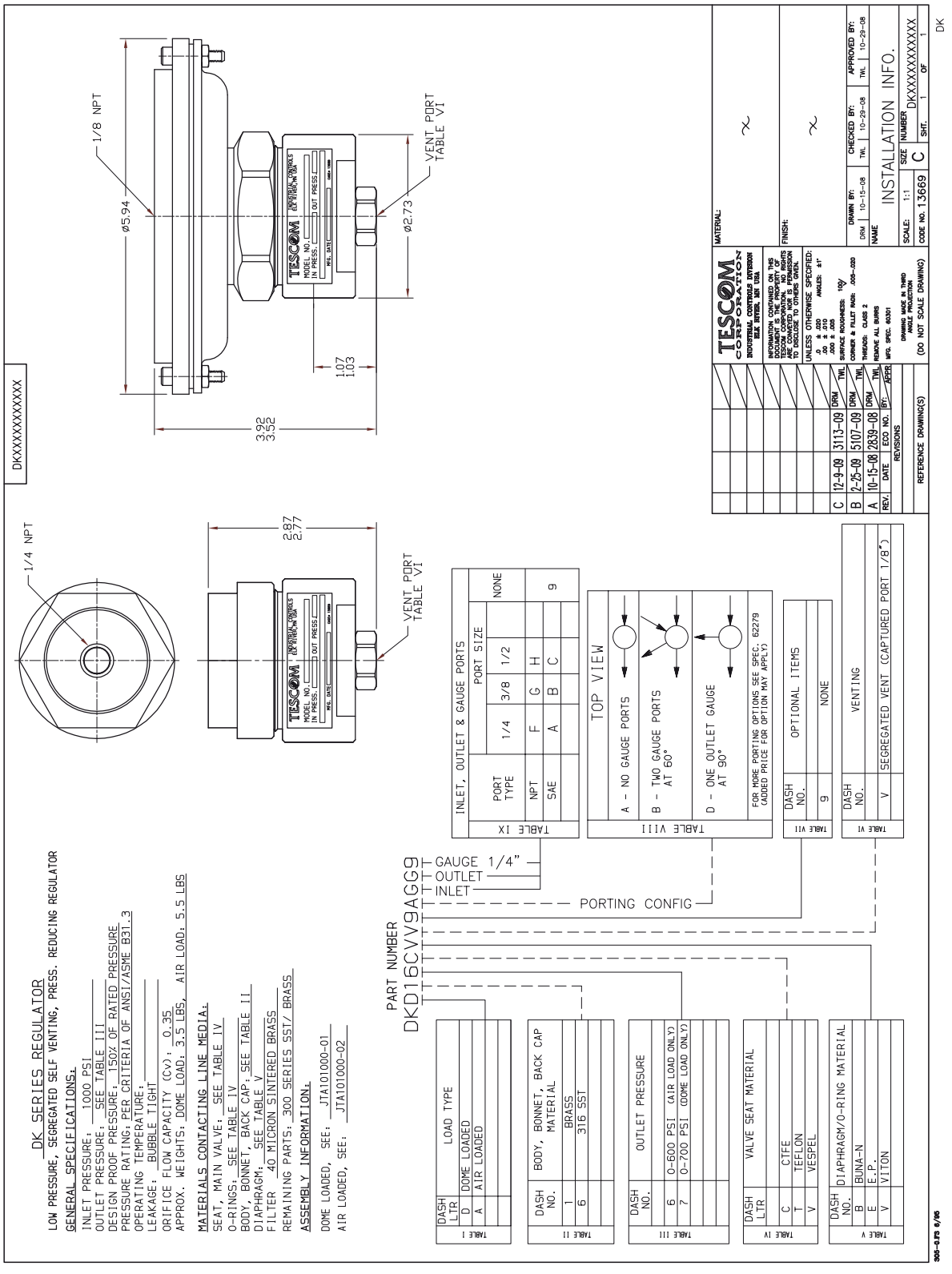
PROJECT: | SHEET: 1 OF 1 | SCALE: 1:5

REVISION			UNITS: MILLIMETERS ASME Y14.5M	DWN	rfieseler	08-Sep-2010	DRAWING	REV
	ECRN NO	0977-10		CHK			ER3JB-XXX	B
	CHANGES	_		APV	frapsch	08-Sep-2010		
	APV BY		DWG STATUS:					

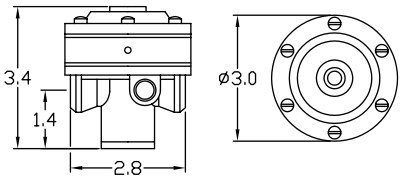
Regulator 26-2000 Series



Regulator DK Series



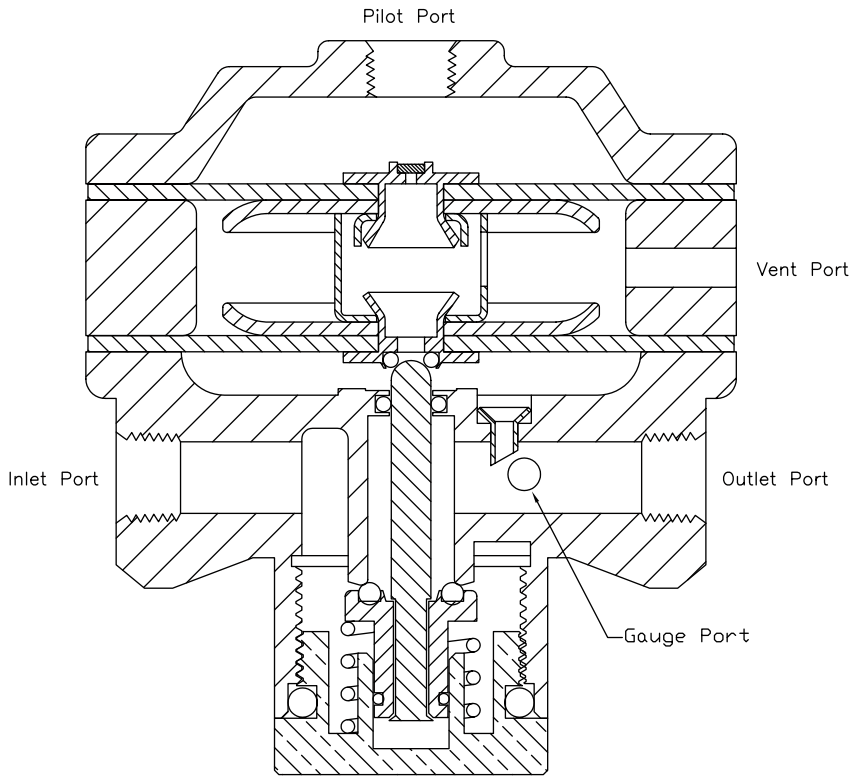
Regulator Flow Booster

Part Number	Installation Dimensions	Inlet & Outlet Port Size	Outlet Guage Port Size	Pilot Port Size	Weight (lbs)	Cv
269–529–04		1/4 NPT	1/4 NPT	1/8 NPT	1.6	1.5
269–529–06		3/8 NPT				2.2

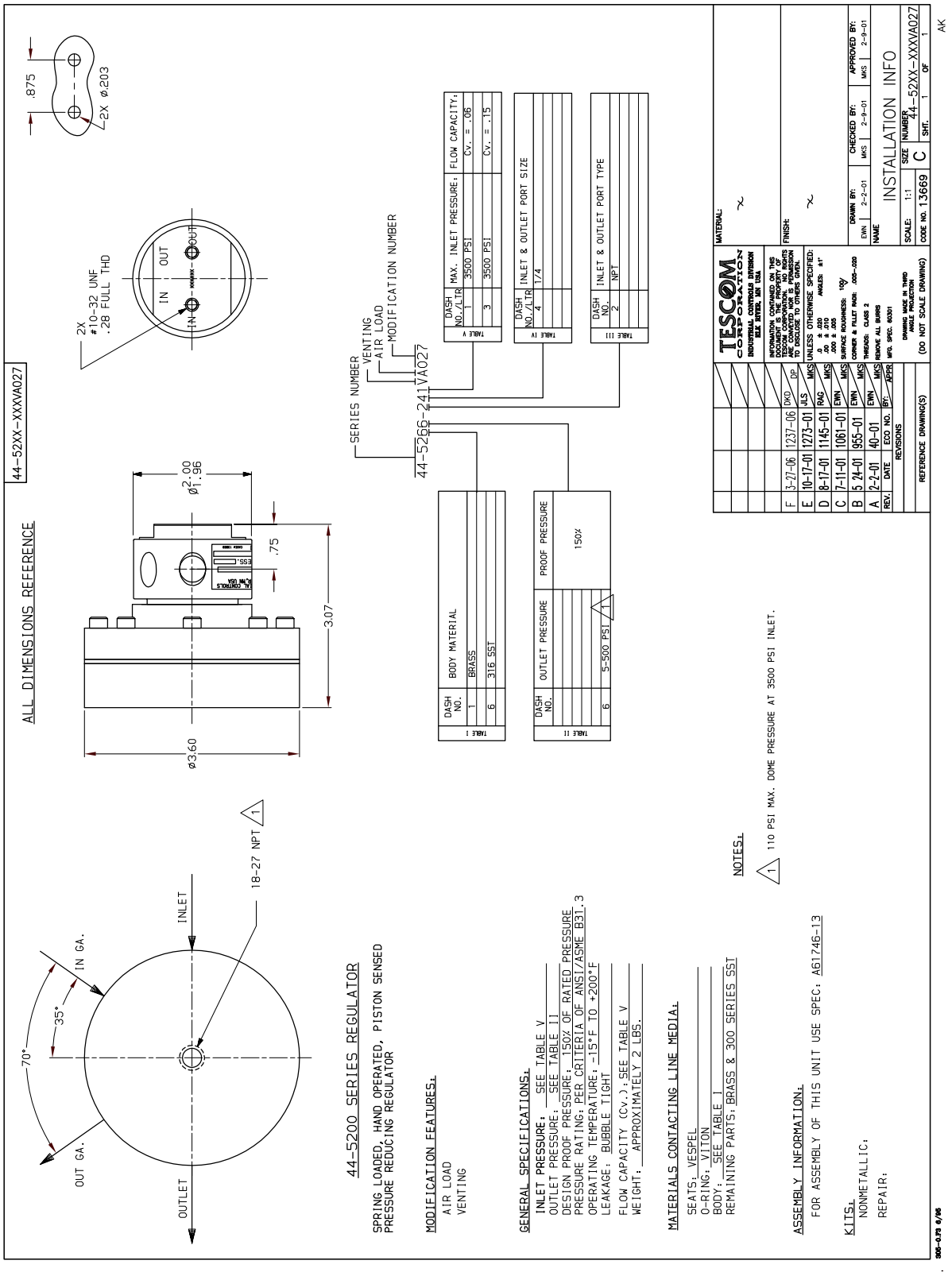
Pilot Operated Diaphragm Style Regulator
Max. Inlet Pressure: 300 psig (20.4 bar)
Max. Outlet Pressure: 290 psig (19.7 bar)
(100psig when used with ER3000)

Temperature Range: 40°–120°F (4.4–48.9°C)
Cast Zinc Body
Pressure Venting is NOT Captured
Constant bleed from pilot pressure to vent for improved control

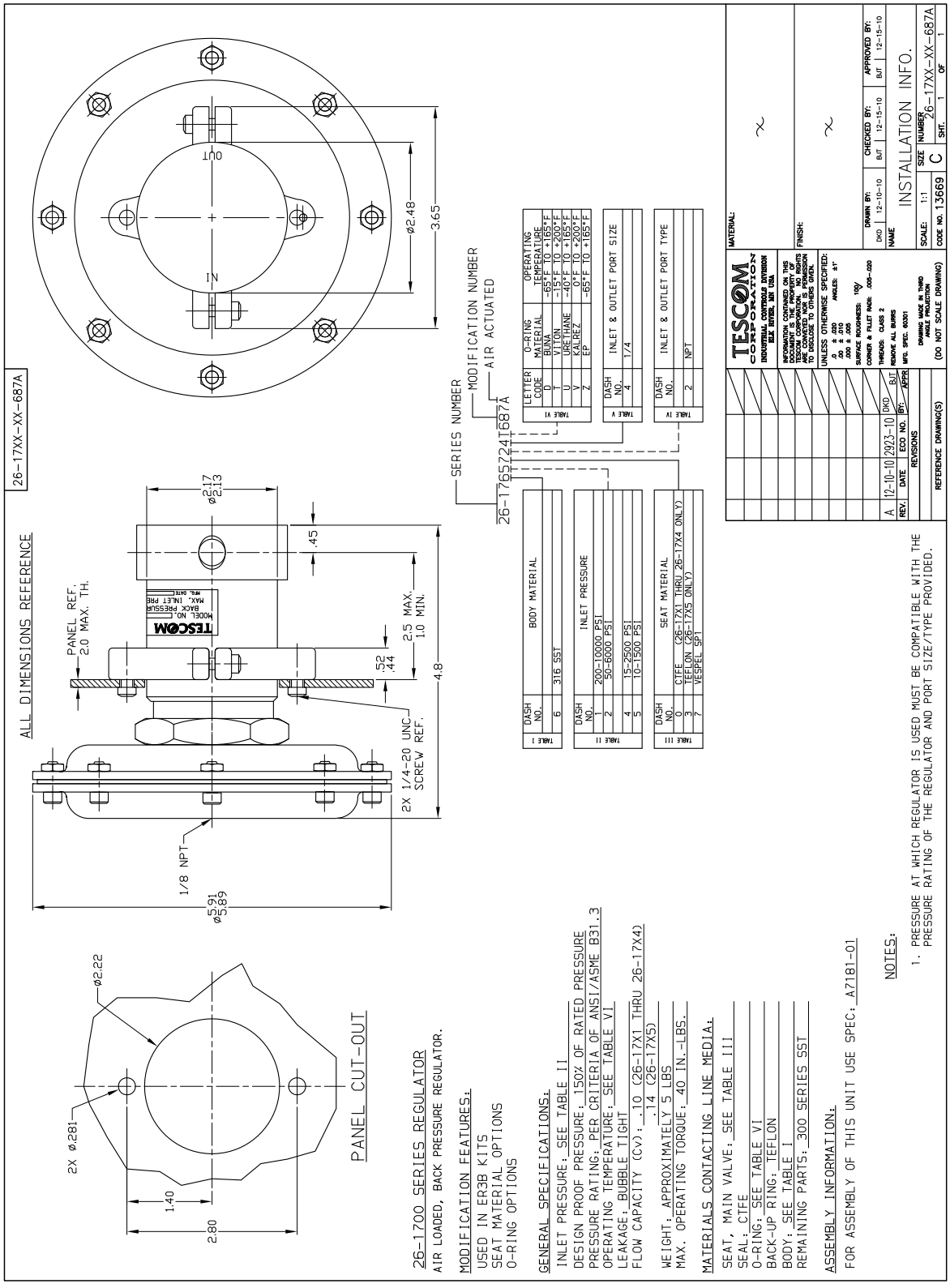
Cutaway Drawing for:
269–529–04
269–529–06



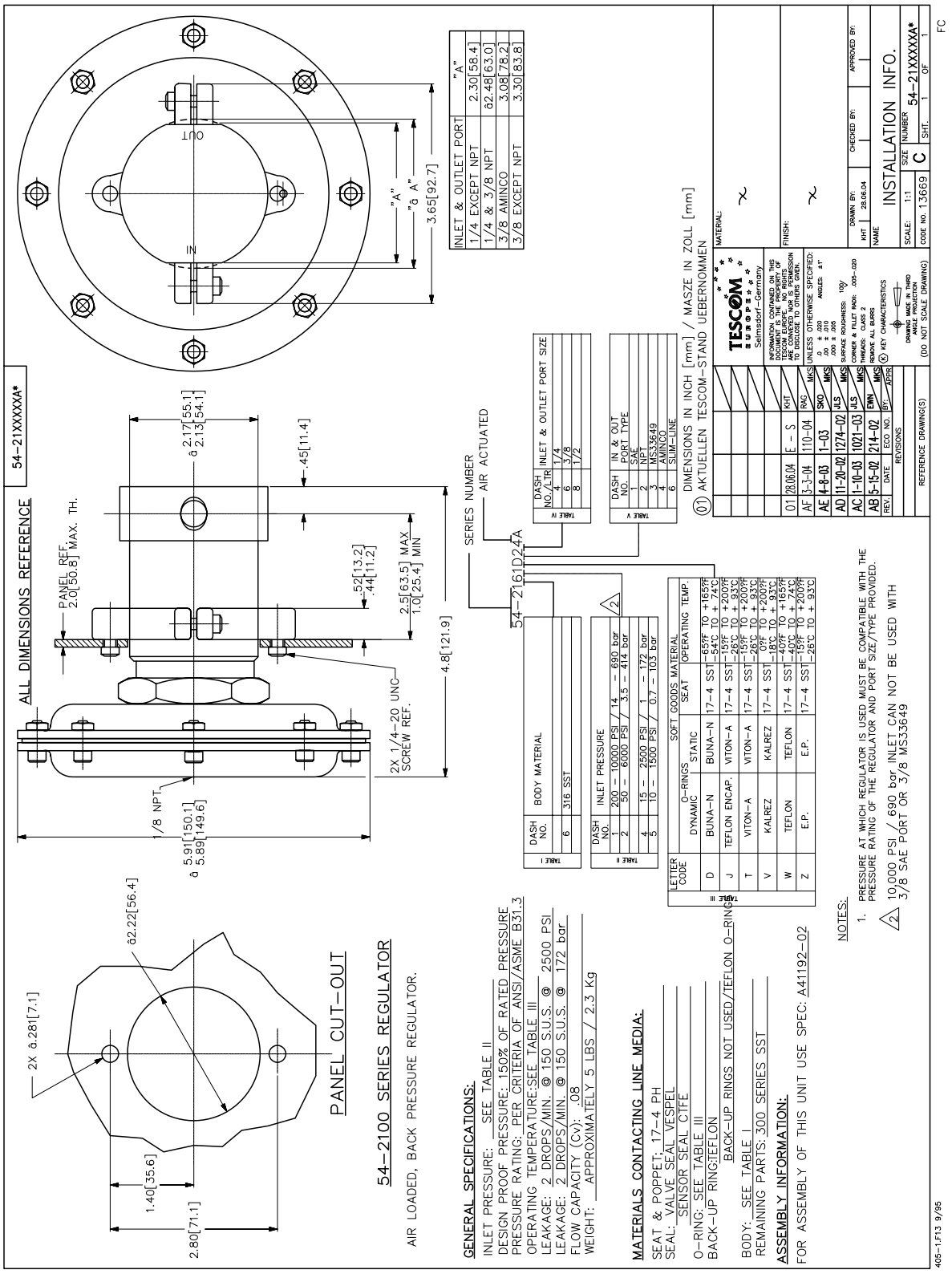
Regulator 44-5200 Series



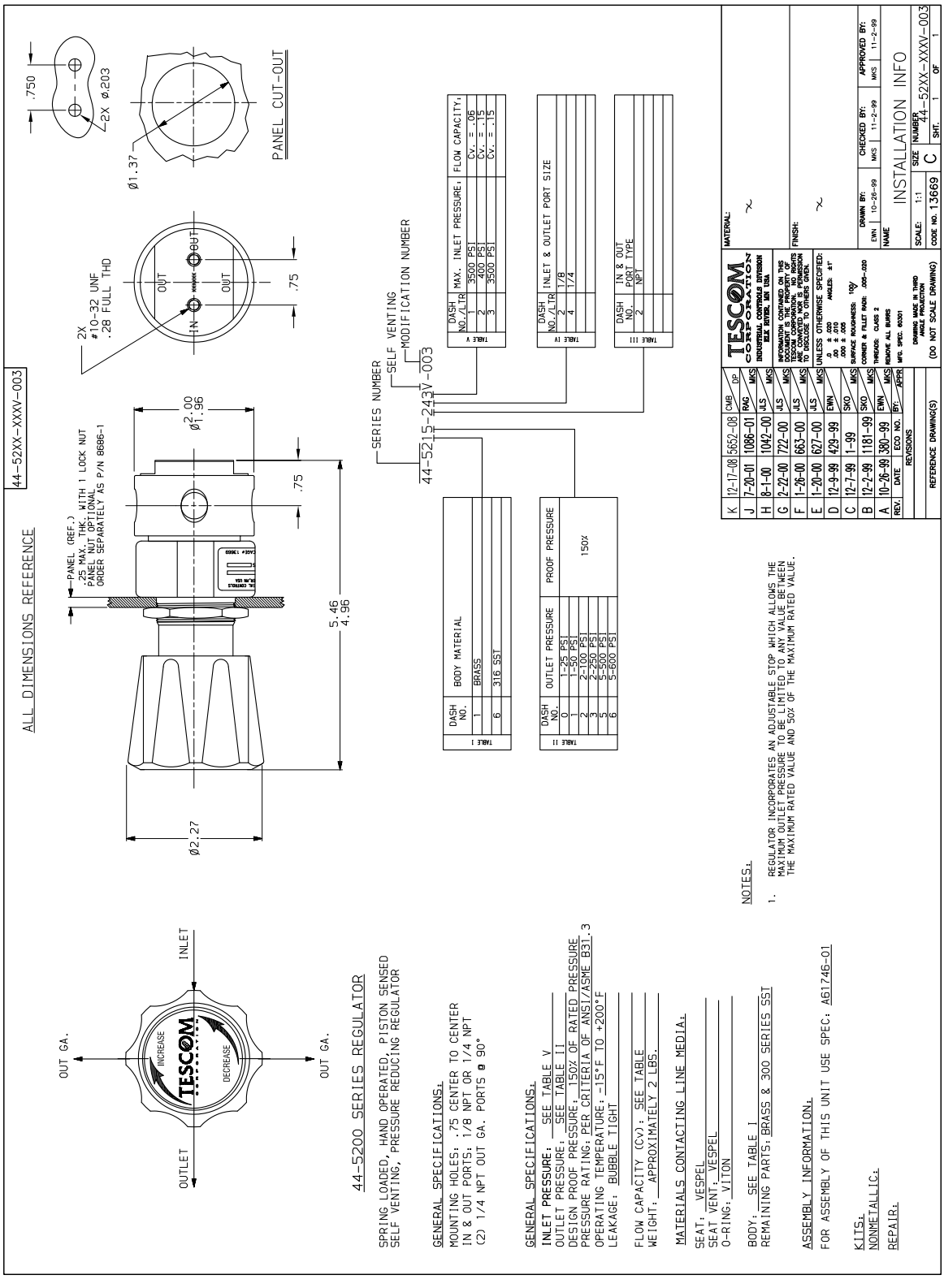
Back Pressure Regulator 26-1700 Series



Hydraulic Back Pressure Regulator 54-2100 Series



Control Air Regulator 44-5200 Series



11 Parts List

#	Part No.	Description
1	ER3000SI-1	Electro pneumatic Controller
1	26-20xx x2x A2x0 DK-D17xxV9Axx9 DK-A16xxV9Axx9 269-529-04 269-529-06 44-52x6-241VA-027 26-176x-2xA 54-216x-x2xA	Mechanical Regulator, air loaded including Elbow compression fitting - NPT 1/4" “x”: see order code
1	D51656-NB-xxx	Pressure transducer ± 0.25%, 4 - 20 mA, 1/4" NPT male or ± 0.1%, 4 - 20 mA, 1/4" NPT male including T-piece NPT 1/4", 2 x selected fitting size
1	D54102	Assembly material: 1 Adapter NPT 1/4" - NPT 1/8" 1 Muffler, NPT 1/4" 1 Cable gland NPT 1/2" 1 Cap NPT 1/2" 4 screws 8-32 UNC 1 Filter 1/8" NPT
1	85138-01	ER3000 Cable, 12 wire, shielded, 1.5 m circuit board connector – open end
1	D54115	Transducer Cable, 2 wire, shielded, 1.5 m DIN 175301-803A – open end
(1)	44-5212-241V-002	Regulator inlet max. 240 bar / 3000 psi, outlet 7 bar / 100 psi, Cv=0.06, venting, brass body, 1/4" NPT ports with 1 Gauge 10 bar (150 psi), 63 mm, brass, 1/4" NPT Tube fittings
(1)	ER3JB-xx	Junction Box
(1)	85061	Converter RS485 – RS232
(1)	82948	Converter RS485 - USB

12 Appendix

- Pressure Transducer

- RS485 Converter

- Instructions for Use of Regulator
  see attached pdf files

26-20, 54-20	dopsmD44307xde2.pdf
26-17, 54-21	dopsmD43746xde2.pdf
44-52	dopsmD43747xde2.pdf
DK	
flow booster	269529 flow booster.pdf

- ER3000 Catalog pages
  ER3000 User's Manual
  see pdf file, or download from the Tescom Internet page:

  www.Tescom.com for the English version
  www.Tescom-Europe.com for the German version

- ER3000 Software
  please download latest version from the Tescom Internet page:

  www.Tescom.com

12.1 Pressure Transducer

Order Code - Bestellcode:
D51656 - NB - xxx

NB:	NPT1/4"	
xxx:	1	1 bar
	2,5	2,5 bar
	4	4 bar
	6	6 bar
	10	10 bar
	25	25 bar
	40	40 bar
	60	60 bar
	100	100 bar
	250	250 bar
	400	400 bar
	600	600 bar

ER3000 Kit

Description

This series of pressure transmitters has been carefully designed to cover the majority of industrial applications with instruments readily available from stock.
Compact design and robust construction make these instruments suitable for all applications in machine construction, process control, laboratory or quality and materials testing equipment.

There is an extraordinary range of instrument variants resulting from the fact that various mechanical and electrical connections can be combined with each other to almost any extent.

Structure

All wetted parts are made of stainless steel and are hermetically welded. Therefore there is no need for additional sealing material, which could possibly react with the pressure medium. The compact case is also made of stainless steel and provides IP 65 ingress protection (special versions up to IP 68).

The transmitters can be supplied with a non-stabilized direct voltage of 10 (14) … 30 V and provide standard industrial output signals.

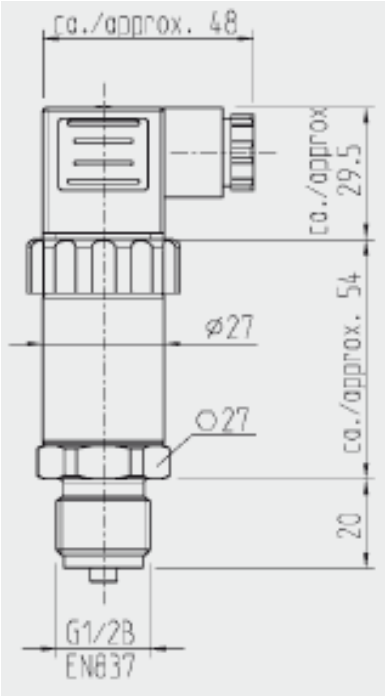
The model S-11 with flush diaphragm is particularly suitable for the measurement of viscous fluids or media containing particulates that may clog the pressure connection of standard industrial transmitters. Thus, a trouble-free pressure measurement is ensured. Pressure transmitters with flush diaphragm are available in pressure ranges from 0 ... 0.1 bar to 0 ... 600 bar. For applications with higher temperature requirements an integrated cooling element enables medium temperatures of up to 150 °C (302 °F).

For the pressure ranges from 0 … 0.25 bar up to 0 ... 1000 bar the pressure transmitters can be delivered for oxygen applications (technical safety check of the BAM, Bundesanstalt für Materialforschung und -prüfung available).

Specifications		Model S-10 / S-11										
Pressure ranges *)	bar	0.1	0.16	0.25	0.4	0.6	1	1.6	2.5	4	6	10
Over pressure safety	bar	1	1.5	2	2	4	5	10	10	17	35	35
Burst pressure	bar	2	2	2.4	2.4	4.8	6	12	12	20.5	42	42
Pressure ranges *)	bar	16	25	40	60	100	160	250	400	600	1000 [1]	
Over pressure safety	bar	80	50	80	120	200	320	500	800	1200	1500	
Burst pressure	bar	96	96	400	550	800	1000	1200	1700 [2]	2400 [2]	3000	
	{Vacuum, gauge pressure, compound range, absolute pressure, other pressure ranges and units are available}											
	[1] Only model S-10.											
	[2] For model S-11: the value specified in the table applies only when sealing is realised with the sealing ring underneath the hex. Otherwise max. 1500 bar applies											
Materials												
▪ Wetted parts												
» Model S-10 *)		Stainless steel										
» Model S-11		Stainless steel				O-ring: NBR [3] {FPM/FKM}						
▪ Case		Stainless steel										
▪ Internal transmission fluid [4]		Synthetic oil {Halocarbon oil for oxygen applications}										
		[3] O-ring made of FPM/FKM for Model S-11 with integrated cooling element.										
		[4] Not for S-10 with pressure ranges > 25 bar.										
Power supply U+	U+ in VDC	10 ... 30 (14 ... 30 with signal output 0 ... 10 V)										
Signal output and	RA in Ohm	4 ... 20 mA, 2-wire				RA ≤ (U+ – 10 V) / 0.02 A						
maximum ohmic load RA		0 ... 20 mA, 3-wire				RA ≤ (U+ – 3 V) / 0.02 A						
		0 ... 5 V, 3-wire				RA > 5 k						
		0 ... 10 V, 3-wire				RA > 10 k						
		{other signal outputs on request}										
Adjustability zero/span	%	± 5 using potentiometers inside the instrument										
Response time (10 ... 90 %)	ms	≤ 1 (≤ 10 ms at medium temperatures below < -30 °C for pressure ranges up to										
		25 bar or with flush diaphragm)										
Insulation voltage	VDC	500 [5]										
	[5] NEC Class 02 power supply (low voltage and low current max. 100 VA even under fault conditions)											
Accuracy [6]	% of span	≤ 0.5 {0.25} [7]										
	[6] Including non-linearity, hysteresis, zero point and full scale error (corresponds to error of measurement per IEC 61298-2)											
	Adjusted in vertical mounting position with lower pressure connection											
	[7] Accuracy { } for pressure ranges ≥ 0,25 bar											
Non-linearity	% of span	≤ 0.2				(BFSL) according to IEC 61298-2						
Non-repeatability	% of span	≤ 0.1										
1-year stability	% of span	≤ 0.2				(at reference conditions)						
Permissible temperature of												
▪ Medium [8] *)		-30 ... +100 °C {-40 ... +125 °C}						-22 ... +212 °F {-40 ... +257 °F}				
»S-11 with cooling element		-20 ... +150 °C						-4 ... +302 °F				
▪ Ambience [8]		-20 ... +80 °C						-4 ... +176 °F				
»S-11 with cooling element		-20 ... +80 °C						-4 ... +176 °F				
▪ Storage [8]		-40 ... +100 °C						-40 ... +212 °F				
»S-11 with cooling element		-20 ... +100 °C						-4 ... +212°F				
	[8] Also complies with EN 50178, Tab. 7, Operation (C) 4K4H, Storage (D) 1K4, Transport (E) 2K3											
Rated temperature range		0 ... +80 °C						32 ... +176 °F				
Temperature coefficients within rated temperature range												
▪ Mean TC of zero	% of span	≤ 0.2 / 10 K (< 0.4 for pressure range ≤ 0.25 bar)										
▪ Mean TC of range	% of span	≤ 0.2 / 10 K										
CE-conformity												
▪ Pressure equipment directive		97/23/EC										
▪ EMC directive		2004/108/EEC, EN 61 326 Emission (Group 1, Class B) and										
		Immunity (industrial locations)										
Shock resistance	g	1000 according to IEC 60068-2-27				(mechanical shock)						
Vibration resistance	g	20 according to IEC 60068-2-6				(vibration under resonance)						

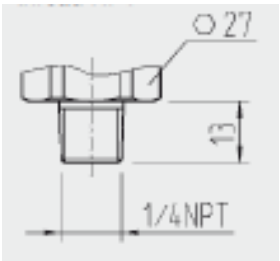
Dimensions

DIN 175301-803 A
L-connector



Connection NB

1/4 NPT
per “Nominal size for US standard tapered pipe thread NPT”



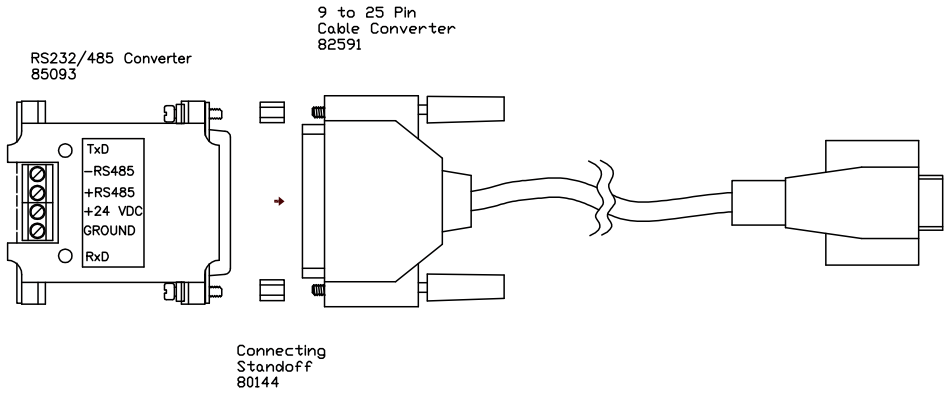
Electrical Connection

	L-connector DIN 175301-803 A		
			
2-wire	U+ = 1	U- = 2	
3-wire	U+ = 1	U- = 2	S+ = 3
Cable screen			
Wire gauge	up to max. 1.5 mm2		
Diameter of cable	6-8 mm (ship approval: 10-14 mm)		
Ingress protection per IEC 60 529	IP 65		

12.2 RS232-485 Converter

RS2485 to RS232 Converter including 9 to 25 pin cable

Part number: 85061



USB to RS485 Converter

Part number: 82948

Instruction for using the datalink communications USB to RS485 converter with the ER3000

Dip Switch Setup:

Set the 4 Dip Switches located on the back of converter to RS485, ECHO OFF, 2 WIRE, 2 WIRE

Wiring:

Attach the green wire from the ER3000 to the Converter´s TDA(-) PIN and the blue wire to the TDB(+) Pin

Driver Installation:

Follow directions provided by Datalink Communications

For your own notes

For your own notes

PRELIMINARY

Instruction Manual
DOPSMD54161XEN2
Rev. A

ER3000 Kit

WARNING! Do not attempt to select, install, use or maintain this product until you have read and fully understood the *TESCOM Safety, Installation & Operation Precautions.*

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