INSTRUCTION MANUAL

KAESER COMPRESSORS

KEP SERIES AIR DRYER

KAESER EXHAUST PURGE DESICCANT COMPRESSED AIR DRYER

TECHNICAL SERVICE DEPARTMENT: (540) 898-5500

WARRANTY

The manufacturer warrants the product manufactured by it, when properly installed, operated, applied, and maintained in accordance with procedures and recommendations outlined in manufacturer's instruction manuals, to be free from defects in material or workmanship for a period of one (1) year from date of shipment to the buyer by the manufacturer or manufacturer's authorized distributor, or eighteen (18) months from the date of shipment from the factory, whichever occurs first, provided such defect is discovered and brought to the manufacturer's attention within the aforesaid warranty period. The manufacturer will repair or replace any product or part determined to be defective by the manufacturer within the warranty period, provided such defect occurred in normal service and not as a result of misuse, abuse, neglect or accident.

The warranty covers parts and labor* for the warranty period. Repair or replacement shall be made at the factory or the installation site, at the sole option of the manufacturer. Any service performed on the product during the warranty period by anyone else other than the authorized Kaeser Distributor must first be authorized by the manufacturer. Normal maintenance items requiring routine replacement are not warranted. Unauthorized service voids the warranty and any resulting charge or subsequent claim will not be paid. Products repaired or replaced under warranty shall be warranted for the unexpired portion of the warranty applying to the original product. The foregoing is the exclusive remedy of any buyer of the manufacturer's product. The maximum damages liability of the manufacturer is the original purchase price of the product or part.

THE FOREGOING WARRANTY IS EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, WHETHER WRITTEN, ORAL, OR STATUTORY, **AND IS EXPRESSLY IN LIEU OF THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.** THE MANUFACTURER SHALL NOT BE LIABLE FOR LOSS OR DAMAGE BY REASON OF STRICT LIABILITY IN TORT OR IT'S NEGLIGENCE IN WHATEVER MANNER INCLUDING DESIGN, MANUFACTURER INSPECTION OF THE EQUIPMENT OR ITS FAILURE TO DISCOVER, REPORT, REPAIR, OR MODIFY LATENT DEFECTS INHERENT THEREIN. THE MANUFACTURER, HIS REPRESENTATIVE OR DISTRIBUTOR SHALL NOT BE LIABLE FOR LOSS OF USE OF THE PRODUCT OR OTHER INCIDENTAL OR CONSEQUENTIAL COSTS, EXPENSES, OR DAMAGES INCURRED BY THE BUYER, WHETHER ARISING FROM BREACH OF WARRANTY, NEGLIGENCE OR STRICT LIABILITY IN TORT.

The manufacturer does not warrant any product, part, material, component, or accessory manufactured by others and sold or supplied in connection with the sale of manufacturer's products.

AUTHORIZATION FROM THE SERVICE DEPARTMENT IS NECESSARY BEFORE MATERIAL IS RETURNED TO THE FACTORY OR IN-WARRANTY REPAIRS ARE MADE.

*(within time table)

4/93

GENERAL SAFETY INFORMATION
CAUTION

1. Pressurized devices-

   This equipment is a pressure containing device.
   * Do not exceed maximum operating pressure as shown on equipment serial number tag.
   * Make sure equipment is depressurized before working on or disassembling it for servicing.

2. Electrical-

   This equipment requires electricity to operate.
   * Install equipment in compliance with national and local electrical codes.
   * Disconnect power supply to equipment when performing any electrical service work.

3. Breathing air-

   * Air treated by this equipment may not be suitable for breathing without further purification. Refer to OSHA standard 1910.134 for the requirements for breathing quality air.

IMPORTANT: READ PRIOR TO STARTING THIS EQUIPMENT
NOTICE

IF MUFFLERS ARE INSTALLED THEY MUST BE REMOVED FOR THE FIRST HOUR OF PRESSURIZED OPERATION TO PREVENT RESIDUAL FINES FORMED IN SHIPMENT FROM PREMATURELY CLOGGING MUFFLERS. REINSTALL MUFFLERS AFTER DUST HAS BEEN BLOWN OUT. IMPORTANT: PURGE AIR MUST BE SAFELY VENTED AND HEARING PROTECTION WORN WHILE MUFFLERS ARE REMOVED. EXHAUST SHOULD BE ROUTED OUTSIDE OR INTO A RAG FILLED BUCKET.

CONTENTS

A. UNPACKING

This shipment has been thoroughly checked, packed and inspected before leaving our plant. It was received in good condition by the carrier and was so acknowledged.
1) Check for Visible Loss or Damage. If this shipment shows evidence of loss or damage at time of delivery to you, insist that a notation of this loss or damage be made on the delivery receipt by the carrier's agent.
2) Check for Concealed Loss or Damage. When a shipment has been delivered to you in apparent good order, but concealed damage is found upon unpacking, notify the carrier immediately and insist on his agent inspecting the shipment. Fifteen days from receipt of shipment is the maximum time limit for requesting such inspection. Concealed damage claims are not our responsibility as our terms are F.O.B. point of shipment.

B. MOVING

CAUTION: Do not lift by piping. Use lifting lugs, or lift truck.

1.0 DESCRIPTION

1.1 FUNCTION

Dual tower regenerative desiccant dryers are an economical and reliable way to dry compressed air to dew points below the freezing point of water or reduce the moisture content of compressed air for use in critical process applications.

Dew points as low as -150°F (1 ppm @ 100 psig) are possible. Dew points of the air leaving the dryer vary depending on the desiccant used, cycle time chosen, and temperature of the compressed air at the inlet to the dryer.

These dryers continuously dry compressed air by using two identical towers, each containing a desiccant bed. While one tower is on-stream drying the compressed air the other tower is off-stream being regenerated (reactivated, i.e., dried out). The towers are alternated on- and off-stream so that dry desiccant is always in contact with the wet compressed air, resulting in a continuous supply of dry air downstream.

Desiccant dryers lower the dewpoint of compressed air by adsorbing the water vapor present in the compressed air onto the surface of the desiccant. Adsorption occurs until an equilibrium is reached between the partial pressure of the water vapor in the air and that on the surface of the desiccant.

Desiccant then is regenerated by driving off (desorbing) the water collected on its surface. This is done by using a blower which moves ambient air through an external heater where the air is heated to 375°F. This dry air is then pushed through the regenerating tower. The moisture laden air exits the dryer into ambient.

After the three hour heating cycle, one hour is allowed for cooling. This is to help reduce a temperature and dewpoint spike at tower switch over.

1.2 OPERATION

1.2.1 AIR FLOW

(Refer to Section 6.2 Flow Diagram)

1.2 OPERATION

The wet inlet gas enters the dryer and flows through the left inlet switching valve (V1). This air is dried as it goes down through the desiccant bed in the left tower (T1). This air passes through the left outlet check valve (CV1) and exits the dryer.

The purge air, deverted from the dry air stream at the dryer outlet, passes thru the orifice (OU1), the heater (HX), and then the right purge check valve (CV4). After flowing upward through the right desiccant tower (T2), this air passes through the right depressurization/purge valve (V3) and is purged to the atmosphere. After the heating cycle is completed the heater shuts off. Now the cooling cycle starts. Purge air flows through the regenerating tower. Before tower switch over the right depressurizaton/purge valve (V3) closes , the purge air repressurizes the regenerating tower (T2). Solenoid valve (SV1, SV2, SV3) switch, causing inlet valves (V1 & V2), and depressurization/purge valves (V3 & V4) to reverse position. Now the inlet air passes through the right inlet switching valve (V2). The air is now being dried by flowing down through the right tower (T2). The air then passes through the right outlet check valve (CV2) and exits the dryer.

As before, purge air, deverted from the dry and cool air stream at the dryer outlet passes through the orifice (OU1), the heater (HX) and then through the left purge check valve (CV3). After flowing upward through the left desiccant tower (T1), this air passes through the left depressurization/purge valve (V4) and is purged to the atmosphere. After the heating cycle is complete the heater shuts off. Now the cooling cycle starts. Purge air flows though the regenerating tower. Before towers switch over, the left depressurization/purge valve (V4) closes, the purge air repressurizes the regenerated tower (T1).

Note: Operation may vary slightly, depending on model. Always refer to the flow diagram.

KAESER COMPRESSORS

Date: 7/12/99

REGENERATIVE DRYER SPECIFICATION SHEET

Model No.: KEP-1260Y4X
Serial No.: 35400
Customer: Kaeser Compressors
Project Reference: Summit Industrial Equipment #112053
Customer P.O. No.: 4500271583

DESIGN OPERATING CONDITIONS:

Gas Composition: Air
Inlet Flow Rate: 1260 SCFM (Referred to 70° F and 14.7 PSIA)
Inlet Pressure: 100 PSIG
Inlet Temperature: 100 ° F
Inlet Moisture Content: Saturated
Outlet Moisture Content: -40 ° F Dewpoint at Line Pressure ☒ at Atmosphere ☐

DETAIL SPECIFICATIONS:

Operation: Automatic ☒
Dryer Cycle (NEMA): 8 Hrs.
Cycle Time: 4 Hrs. on Stream 3 Hrs. Heating 1 Hrs. Cooling
Adsorbent Type: 3/16" Activated Alumina 720 # per Chamber
Buffer Desiccant Type: N/R # per Chamber
Purge Rate: 89 SCFM Open System ☒ Closed System ☐
Source: Dried Gas ☒
Design Pressure: 150 PSI ASME Code Stamped: Yes ☒ No ☐
Pressure Drop: 5 PSID (Max.)
Connection Size 5" 125# F.F. Flange Chamber Relief Valves: Yes ☒ No ☐
Chamber Insulation: None ☒ Indoor ☐ Outdoor ☐

UTILITIES:

Elect. Construction NEMA Class: 4 Input 600 V 60 CY 3 PH
Heater Size: 10 KW
Average Power Consumption: 138.2 KW Hrs. per 24 Hrs.
Average Control Consumption: 75 Watts @ 120 V 60 CY 1 PH
Control Transformer: Included ☒ Not Required ☐
Steam PPH: -- @ PSIG
Dryer Control Air (Provided): 60 PSIG (Min.)

INSTRUMENTATION:

Dewpoint Demand System (VDC):	Yes ☐	No ☒
Pressure Gauges:	Locally Mounted ☐	Panel Mounted ☒
Temperature Gauges:	Locally Mounted ☒	Panel Mounted ☐
Moisture Indicator:	☐	
Indicating Lights:	☐	
Purge Flow Indicator:	☒	
Switching Failure Alarm:	☐	
Other:		

ACCESSORY EQUIPMENT:

Pre-filter Model No.: _____ Cartridge No. _____ Quantity: _____

After-filter Model No. _____ Cartridge No. _____ Quantity: _____

Pre-filter Drain Trap: Automatic ☐ Manual ☐

Type Automatic Drain Trap: _____

Other: _____

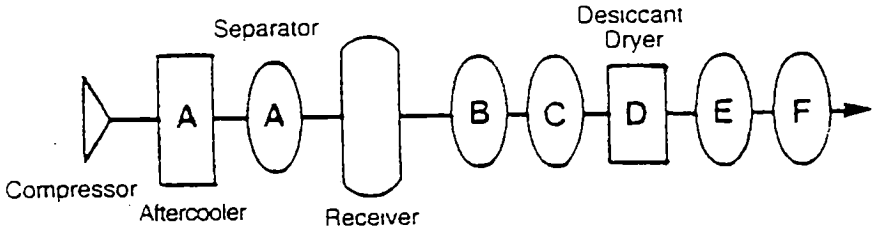
Shipping Weight: 2290 Lbs. (approximately)

2.0 INSTALLATION

NOTE: See separate instructions if unit is supplied with option alone of the Energy Saver™ Controllers.

2.1 LOCATION

LOCATION IN COMPRESSED AIR SYSTEM - To ensure long service life for the desiccant, prefilters must be installed to remove liquid water contaminants and oil from the inlet air. This can be accomplished by installing appropriate filters upstream of the desiccant dryer. To prevent desiccant dust from traveling downstream, an appropriate filter should be installed on the outlet of the desiccant dryer. See Figure 2 for recommended installation arrangement.



A. REFRIGERATION TYPE AIR DRYER - This type of dryer is usually located upstream of filtering devices since the cooling of air after filtration can cause the formation of additional liquid aerosols by condensation. NOTE: Installation of a refrigeration dryer ahead of a Blower Purge Dryer does not necessarily reduce the Blower Purge Dryer size. However, it does reduce power consumption during regeneration if one of the Energy Saver™ Controllers is installed

OR

COOLING UNIT - Cooling Unit may be installed here to reduce the inlet air temperature to the dryer. Lower inlet temperatures at 100% relative humidity produce lower outlet dew points as well as reduce dryer size.

NOTE: In order to avoid excessive liquid loading install a separator or receiver tank upstream.

B. ALF - Air Line Filter - on compressed air systems utilizing non- lubricated (oil free) air compressors, use to protect desiccant bed from solid and liquid contamination. On systems with lubricated compressors, use as a prefilter ahead of the ORF filters or both for optimum protection.

C. ORF coalescing type Oil Removal Filter - On systems with lubricated compressors, use to remove oil aerosols and protect desiccant bed from oil contamination.

D. Exhaust Purge Dryer - Desiccant dryer is located downstream of solid and liquid removal filters to prevent contamination or poisoning of the desiccant bed thereby extending its useful life.

PREFILTERS (B&C) - Adequate filtration is required upstream of the dryer in order to protect fouling of the desiccant bed.

Afterfilters (E&F) - To ensure downstream air purity adequate filtration downstream of the dryer is required. Depending on the degree of purity you require from your compressed air system, the following filters are recommended.

E. HTA - High Temperature Afterfilter - Use as an afterfilter to remove desiccant fines and protect downstream components from solid particles 1 micron and larger. NOTE: Since typical desiccant fines are above 1 micron in size, actual particle size downstream of HTA filter will be 0.025 micron.

F. OVA - Oil Vapor Adsorber - To remove oil vapor and other gaseous hydrocarbons. The produced oil vapor concentration are well below the level where they can be detected by smell or taste.

NOTE: By-pass lines and isolation valves are recommended so that maintenance service work can be performed without shutting off the air supply.

IMPORTANT:
The compressed air supply inlet should be periodically checked to ensure that equipment design specifications are not exceeded. Normally the compressor installation includes intercoolers, aftercoolers, separators, receivers or filters which adequately pretreat the compressed air supply in order to avoid excessively high air temperatures and liquid slugging of downstream equipment.

2.2 MAXIMUM OPERATING PRESSURE

Maximum operating pressure: See identification label on your unit to determine maximum working pressure of dryer.
Observe system pressure. Do not operate the dryer at pressures above the maximum pressure shown on the identification label.

2.3 MINIMUM AND MAXIMUM AMBIENT

Minimum 35°F (1.7°C); maximum 120°F (49°C) ambient.
If installed in ambient below 35°F, heat tracing of the prefilters and inlet piping and valves is necessary to prevent condensate freezing.

2.4 ANCHORS

Install dryer on a level pad on floor. Holes are provided in the floor stand base angles for floor anchors if desired. They must be used if area is subject to vibrations.

2.5 PIPING

2.5.1 INLET, OUTLET PIPING

Observe location of inlet and outlet connections as indicated in the dimensional drawings and connect inlet and outlet piping. All piping must be supported so as not to bear on the dryers or filters.

2.5.2 PURGE EXHAUST PIPING

Depressurization/ purge valves should be piped outdoors to eliminate indoor condensation and reduce noise levels. Keep the purge valve piping as short as possible and use a minimum of bending, i.e. 90° and 45° elbows.

Follow these recommendations for the depressurization/purge valve piping to minimize back pressure.

1. If the purge piping is 15 feet or shorter, use the same pipe size as the depressurization/purge valve.
2. If the purge piping is 15-30 feet, use one pipe size larger than the depressurization/purge valve.
3. If the purge piping is 30-50 feet, use two pipe sizes larger than the depressurization/purge valve.
4. If the purge piping is 50-100 feet, use three pipe sizes larger than the depressurization/purge valve.

2.6 POWER SUPPLY

Check to see that power supply to dryer is the same as the power requirements indicated on the identification label. Connect wires as shown in the electrical wiring diagrams and ground on mounting plate.

2.7 INITIAL DESICCANT CHARGE

The dryer is shipped complete with desiccant and ready to operate after piping and electrical connections are made. For desiccant size/type used, please refer to specification sheet. Do not substitute desiccant with any other type or size.

3.0 OPERATION

3.1 START-UP

3.1.1 Slowly pressurize the dryer. Open inlet valve, outlet valve closed.

3.1.2 Energize the dryer.

NOTE: On units with optional switching failure alarm, alarm (light) may be activated if unit is energized before it is pressurized. To deactivate alarm, turn On-Off switch off, then back on after dryer is pressurized.

NOTE: To prolong muffler life, mufflers may be removed during first four cycles to prevent residual fines from prematurely clogging mufflers. IMPORTANT: If this procedure is followed, purge air must be safely vented and hearing protection worn while mufflers are removed.

3.1.3 Establish normal flow through the dryer (slowly open outlet valve).

IMPORTANT

When dew points below -40°F are required, the dryer must be run with an inlet flow rate of less than 50% of maximum until the desired dew point is attained. Depending on the initial dryness of the desiccant, this can take as long as 2 to 3 days. This stabilization period is required on initial startup, after dryer has been shut down for extended periods of time, and after dryer maintenance (desiccant change, etc.).

3.2 Inlet, Purge, Outlet Flows.

3.2.1 Inlet Flows.

In order to determine the required rated dryer capacity at various inlet pressures and inlet temperatures multiply your inlet air flow with the inlet air pressure factor and inlet air temperature factor.

For example: Inlet flow 600 SCFM, Inlet air pressure 140 PSIG, Inlet air temperature 90°F. [600 SCFM X 0.74 X 0.72 = 320 SCFM]. Therefore, a KEP 350 should be selected. (See table below)

Inlet Air Pressure		Inlet Air Temperature	
PSIG	Factor	° F	Factor
		75	0.45
40	2.08	80	0.53
60	1.54	85	0.63
75	1.28	90	0.72
100	1.00	95	0.86
110	0.92	100	1.00
120	0.85	105	1.16
140	0.74	110	1.35
150	0.70	120	1.78

.3.2.2 Purge Flow.

Purge Flow is the air flowing through the off-stream tower when the purge repressurization valve is open. Heated ambient air is primarily used as purge air. After the purge represurization valve closes the purge flow stops.

3.2.3 Outlet Air Flow.

Six - Seven Percent (of the rated inlet flow) dry air is used as purge air. Therefore, the available air at the outlet will be reduced by this amount.

3 3.3 Operating Conditions

3.3.1 Maximum working pressure:

See identification label on your unit to determine maximum working pressure of dryer.

3.3.2

Minimum working pressure: 60 Psig. If lower inlet pressures are encountered, consult factory. It is recommended that the air dryer be operated at the highest available pressure without exceeding the maximum working pressures since the dryer capacity increases and the % of purge air decreases as the pressure increases.

3.3.3 Maximum operating temperature: 120°F (48.9°C).

3.3.4 Outlet pressure dew points at various inlet compressed air temperatures: The outlet pressure dew point is determined in part by the compressed air temperature at the inlet to the dryer, desiccant type used, regeneration temperature etc. Refer to the specifications sheet for the dewpoint.

3.4 Operational Check Points.

3.4. Check periodically that there is power to the unit.

3.4.2 Once a week, check the purge flow for possible blockage. Corrections or repairs should be made if the purge flow meter is not reading the correct level (see specifications sheets).

IMPORTANT: Proper purge flow must be maintained for sufficient regeneration.

3.4.3 Switching Failure Alarm Option

If unit is supplied with Switching Failure Alarm, periodically check for the red alarm light. Alarm light will be on if either tower fails to pressurize at the proper time. Optional remote contacts can be supplied for a remote alarm.

NOTE - Alarm will indicate if dryer is energized without being pressurized. If towers are switching properly and alarm light continues to operate, reset alarm by turning off power (On/Off switch) for 30 seconds (dryer pressurized).

3.4.4 Periodically check tower pressure gauges to verify that valves are operating and sequencing correctly.

3.4.4.1 Inlet switching and purge/repressurization valves.

3.4.4.1.1 Operation

Tower pressure gauge of tower on line should read line pressure. No air should be leaking from purge/ repressurization valve while tower is on line. Tower pressure gauge of tower off line should read below 2 Psig while tower is purging. If excessive purge air is exhausting during purge cycle, inlet valve may have failed to close or a check valve, may be stuck. Refer to section 5.0.

3.4.4.1.2 Operating Sequence

Refer to section 1.2 for a general description of operating sequence.

3.4.4.2 Check valves

Check valve sticking will result in excessive air discharge through a muffler. If excessive air is discharged through the muffler on the left, check valve CV1 or CV4 is sticking. If excessive air is discharged through the muffler on the right, check valve CV2 or CV3 is sticking.

3.5 Dryer Shutdown

To shut down the dryer, de-energize using the on-off switch. Unit will remain pressurized.

3.6 Depressurization

To depressurize unit:

3.6.1 Open by-pass valve (if one is installed) and close inlet and outlet valve.

3.6.2 Run timer through a tower change cycle until pressure gauges on both towers read 0 Psig.

3.7 Loss of Power

The solenoid valves are designed so that upon loss of power, the inlet air switching valves maintain their position and the purge and repressurization valves close. The air dryer is then capable of drying air until desiccant exposed to the air flow is saturated.

4.0 MAINTENANCE

CAUTION: The Exhaust Purge Dryer is a pressure containing device. Depressurize before servicing. (See Section 3.7.)

4.1 Preventive Maintenance

4.1.1 Monthly

a. Check operating conditions: inlet flow, inlet pressure, temperature and purge rate.
b. Check prefilter and afterfilter.
c. Check dryer operating cycle.

4.1.2 Semi-Annually
a. Check outlet dewpoint
b. Blow down relief valve

4.1.3 Annually
a. Check desiccant and replace, if necessary
b. Inspect and clean pilot operated valves and replace packings, if necessary
c. Inspect and clean solenoid valves.

4.2 Desiccant Replacement

IMPORTANT: The use of the correct replacement desiccant is necessary for proper dryer operation. Never use hydroscopic salts of the type commonly used in "deliquescent" type dryers.

4.2.1 Frequency of desiccant replacement

Desiccant should be replaced whenever the required dew point cannot be maintained while the dryer is being operated within its design conditions and there are no mechanical malfunctions. Refer to section 5.0 for troubleshooting hints.

NOTE: Desiccant life is determined by the quality of the inlet air. Proper filtration of the inlet air, as well as staying within rated inlet flow conditions, will extend the life of the desiccant. Normal life expectancy is between 3-5 years.

4.2.2 Procedure for Desiccant Charge Replacement

4.2.2.1 Depressurize and de-energize the dryer. (See section 3.6)

4.2.2.2 Remove the fill and drain plugs from desiccant tower and drain the desiccant. If necessary tap the side of the vessels with a rubber mallet to loosen desiccant.

4.2.2.3 Install the drain plug using teflon tape sealant or equivalent.

4.2.2.4 Fill the desiccant drying tower with the proper quantity, type and size of dry desiccant. Do not tap desiccant.

4.2.2.5 Install the fill plug using teflon tape sealant or equivalent.

4.2.2.6 Repeat this procedure for the other desiccant drying tower.

4.2.3 Insuring desiccant dryness.

4.2.3.1 Replacement desiccant is shipped in air tight containers. Keep the covers on these containers tightly closed until use to avoid moisture contamination. If desiccant is exposed to air it can be heated in an oven at 400°F for four hours before use, or the procedure in 4.2.3.2 can be used.

4.2.3.2 If the dryer is not refilled with dry desiccant, it will be necessary to operate the dryer with an inlet flow rate of less than 50% of its rated capacity , to dry the desiccant. This has to be done until the desired outline dew point has been established.

4.3 PILOT AIR FILTER CARTRIDGE REPLACEMENT

1. If the dryer is equipped with bypass valves, bypass the air dryer and turn off.
2. If the dryer does not have bypass valving, turn off the air compressor and then shut off the air dryer.
3. Slowly depressurize the air dryer (system).
4. Remove the pilot air filter housing ring by turning counterclockwise.
5. Remove the filter housing to expose the element.
6. Remove the used element and replace with a new element.
7. Replace the filter housing, and housing ring and tighten. (Be careful not to pinch O-ring.)
8. Turn compressor and dryer on, or redirect air into the dryer.
9. Slowly pressurize dryer and check for leaks.

5.0 TROUBLE SHOOTING GUIDE

PROBLEMS	PROBABLE CAUSE(S)	REMEDY
Elevated dewpoint.	1. Insufficient purge rate.	1. Exhaust pipe to small, enlarge to proper size. (see section 2.5.2)
		2. Check purge control valve setting and clean, if necessary.
operation.		1. Check blower for proper
	2. Inlet gas pressure below design condition.	1. Check pressure.
	3. Flow rate higher than design condition.	1. Check flow rate.
	4. Inlet temperature above design condition.	1. Check aftercooler.
	5. Entrained water entering desiccant bed.	1. Check separator and prefilter.
		2. Replace desiccant, if necessary. See 5.
	6. Desiccant contaminated	
Excessive pressure drop through dryer.	1. Excessive flow rate.	1. Check flow rate.
	2. Inlet pressure below design condition.	2. Check pressure.
		1. Check separator and prefilter.
		2. Replace desiccant, if necessary.
Failure to switch towers.	1. No input power.	1. Check timer micro-switch. Check fuses
	2. Defective solenoid valves.	2. Check solenoid valves.
	3. Defective timer motor.	3. Replace motor.
	4. No pilot air.	4. Check pilot air line/filter.

5.0 TROUBLE SHOOTING GUIDE CONTINUED:

PROBLEMS	PROBABLE CAUSE(S)	REMEDY
Dryer fails to pressurize.	1. Faulty pressurization valve.	1. Check pressure valve operator and check pressurization valve. 2. Check timer micro-switch.
Dryer depressurizes too rapidly.	1. Depressurization valve not operating; dryer depressurizing through purge valve.	1. Check depressurization valve operator and check depressurization timer circuit.
Dryer fails to purge.	1. Purge valve fails to open.	1. Check timer micro-switch. 2, Check purge valve operator. 3. Check and repair purge valve, if necessary.

PRODUCT SPECIFICATION SHEET

MODEL:	REV:
120-1-Z155-056	-

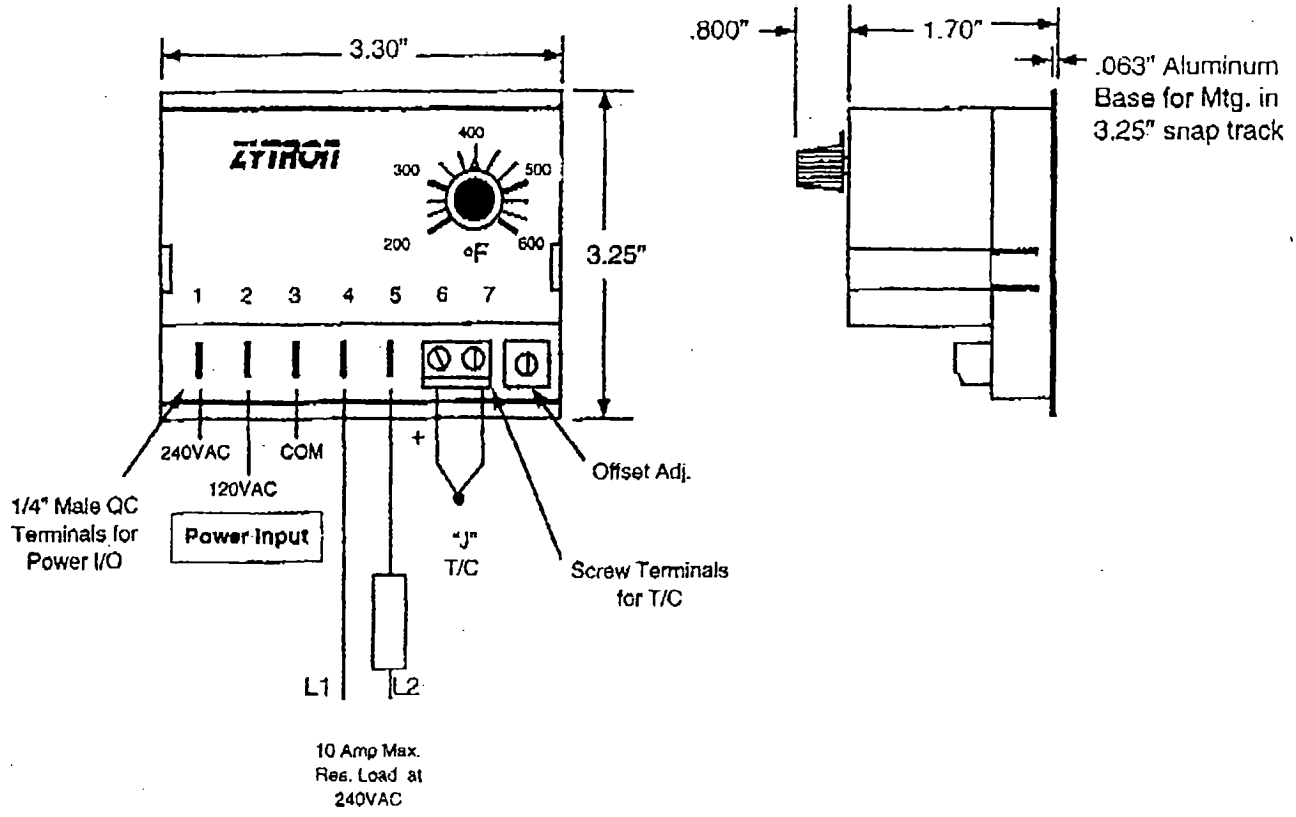
DESCRIPTION:	CUSTOMER PN:	DATE:
Snap Track Mtg. Local SP Thermocouple Controller	Lesman Instrument	4/12/96

Power Input:	120/240VAC ±10%, 50/60Hz, 3VA Max.
Control Output:	Relay, SPST, 10 Amp relay
Control Mode:	On-Off with 2°F Hysteresis typ. (relay contacts open-on-rise)
Setpoint Range:	200°F to 600°F
Sensor:	Type "J" Thermocouple
TC Break Protection:	Output de-energizes with TC break
Compensation:	Automatic cold junction compensation
Amb. Oper. Temp:	0 to 70°C (32 to 158°F)

MECHANICAL

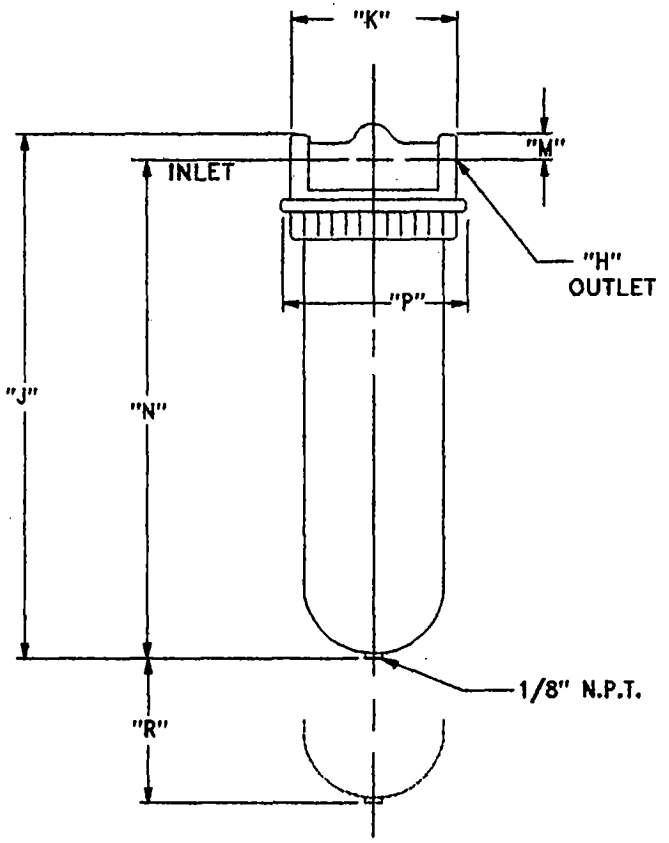
Enclosure Material:	Noryl, Black color
Field Terminations:	1/4" Male QC terminals for power input and relay output; miniature screw terminal block for TC connection.

DIMENSIONS:



LTR	DESCRIPTION	DATE

MODEL NO.	H PIPE SIZE	J	K	M	N	P	R ELEMENT REMOVAL CLEARANCE	WEIGHT	FILTER ELEMENT		MAXIMUM SUPPLY PRESSURE PSI	MAXIMUM OPERATING TEMP.	FILTER LENGTH
									ELEMENT NUMBER	QUANTITY			
HEF-60	3/4" N.P.T.	15 1/2"	4 1/2"	1"	14 1/2"	5"	4"	15	16D33F	1	300#	250 °F	4 1/2"



REV.	DATE	DESCRIPTION OF REVISION	APPROVED

KAESER COMPRESSORS

PILOT AIR FILTER
HEF-60

SCALE: NONE	DRAWN BY: ART	DATE: 9/8/98	APPROVED:
UNLESS SPECIFIED TOLERANCES ARE: FRACTIONS +/- 1/64" DECIMALS +/- .010	ORIGINAL NO.		DWG. NO. 55003-K

TL Utility Gauges-Weiss Series TLG

APPLICATION

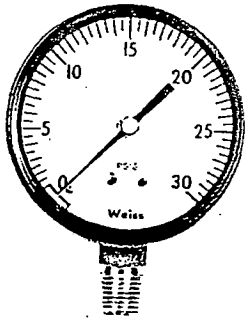
The Weiss series TL gauges are intended for general service conditions, for pressure or vacuum on air, oil, water, gas or other mediums that do not attack brass.

Steam service gauges should be protected from excessive temperature by installation of a syphon (coil type, Cat. No. SY14-S iron, or SY14-B brass).

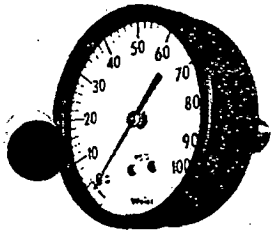
SPECIFICATIONS: CASE & RING- Drawn steel case with friction fitted steel ring, finished in black. BOURDON TUBE ASSEMBLY- Bronze, soft soldered to socket and tip. SOCKET- Brass bar stock 9/16" square wrench surface. 1/4" male NPT lower or back connection. 1/8" NPT also available on panel gauges and on special order. DIAL- White coated metal lithographed, with black graduation lines and numerals, dial mounted on socket, independent of case. MOVEMENT- All brass construction, precision gear and pinion. Mounted on socket independent of case. POINTER- Balanced design, aluminum in black finish. ACCURACY- 2% of the middle third of the entire range. ANSI-ASME B40.1 Grade B.

CASE STYLES

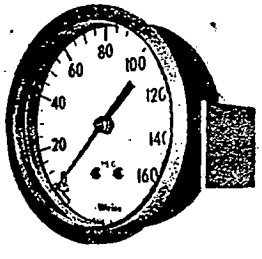
Black steel case, Standard. Stainless Steel and Plastic cases available on special order.



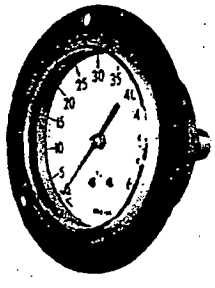
LOWER CONNECTION
SIZE 1-1/2, 2, 2-1/2, 3-1/2, 4-1/2"
THREADED CONNECTION 1/4" NPT (ON 1-1/2", 1/8" NPT ONLY)
FRICTION FITTED STEEL RING WITH PLASTIC WINDOW (GLASS ON 3-1/2" & 4-1/2")



DIRECT BACK CONNECTION
SIZE 1-1/2, 2, 2-1/2, 3-1/2"
THREADED CONNECTION 1/4" or 1/8"NPT
FRICTION FITTED STEEL RING WITH PLASTIC WINDOW (GLASS ON 3-1/2")



BACK CONNECTION "U" CLAMP MOUNT PANEL GAUGE
SIZE 1-1/2, 2, 2-1/2 "
THREADED CONNECTION 1/4" or 1/8"NPT (ON 1-1/2", 1/8" NPT ONLY)
PUSH-IN MOLDED ONE PIECE LEXAN WINDOW (STANDARD)



BACK CONNECTION "F" FRONT FLANGE PANEL GAUGE
SIZE 2, 2-1/2"
THREADED CONNECTION 1/4" or 1/8" NPT
PUSH-IN MOLDED ONE PIECE LEXAN WINDOW (STANDARD)

NOTE: FOR THERMOMETERS IN MATCHING CASE STYLES REFER TO 716-782 SPEC. SHEET. FOR "U" or "F" STYLE PANEL GAUGES, CHROME LIKE STAINLESS STEEL BEZELS AVAILABLE.

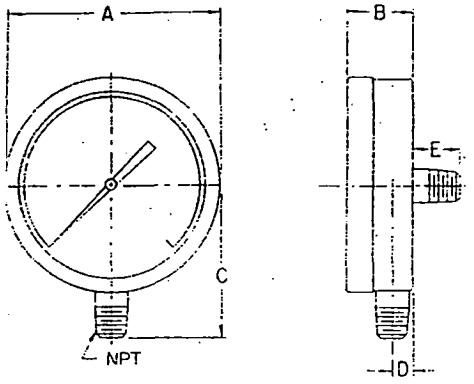
TO SPECIFY

Series TL +	Dial Size +	Pressure,	Vacuum	or	Compound +	Case Style +	NPT Size +	Location +	Range
TL	15, 20, 25, 35, 45	P	V		VP	"U" - U Clamp	1/8" or 1/4"	LM - Bottom	—
	1½, 2, 2½, 3½, 4½					"F" - Front Flange		CBM - Back	

EX: TL20P-U 1/4" CBM 0-15 PSI

WARNING: To prevent misapplication, media and ambient operating conditions should be considered when selecting pressure gauges. Improper gauge application can be detrimental, causing failure and possible property damage or personal injury. Additional information can be obtained by reading Pressure Gauge Standard ANSI/ASME B-40-1, available from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th St., New York, NY 10017

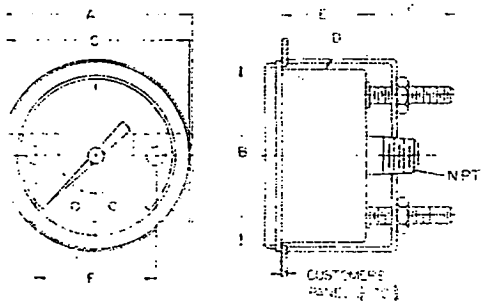
Case Dimensions



LOWER OR BACK CONNECTION

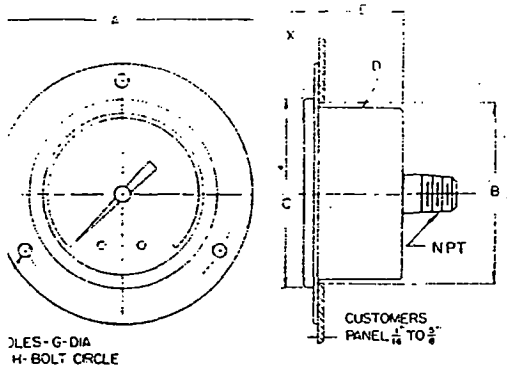
GAUGE SIZE	A	B	C	D	E	N.P.T.
1-1/2"	1-21/32	13/16	1-7/16	17/64	41/64	1/8
2"	2-1/16	1-1/8	1-7/8	3/8	7/8	1/4 or 1/8
2-1/2"	2-23/32	1-1/8	2-5/32	3/8	7/8	1/4 or 1/8
3-1/2"	3-11/16	1-1/8	2-5/8	3/8	7/8	1/4 or 1/8
4-1/2"	4-3/4	1-3/16	3-3/8	3/8	–	1/4

NOTE: 4½" available in lower connection, only.



U-CLAMP MOUNT

SIZE	A	B	C	D	E	F	G	H	X	N.P.T.
1-1/2"	1-53/64	1-5/8	1-21/32	1-19/32	1-35/64	1-1/8	–	–	7/64	1/8
2"	2-7/32	2-1/16	2-11/64	2-1/32	31/32	1-3/8	–	–	3/16	1/4 or 1/8
2-1/2"	2-13/16	2-11/16	2-15/16	2-19/32	1	2	–	–	3/16	1/4 or 1/8



FRONT FLANGE MOUNT

SIZE	A	B	C	D	E	F	G	H	X	N.P.T
2"	2-15/16	2-1/16	2-11/64	2-1/32	31/32	–	9/64	2-9/16	3/16	1/4 or 1/8
2-1/2"	3-11/16	2-11/16	2-15/16	2-19/32	1	–	11/64	3-5/16	3/16	1/4 or 1/8

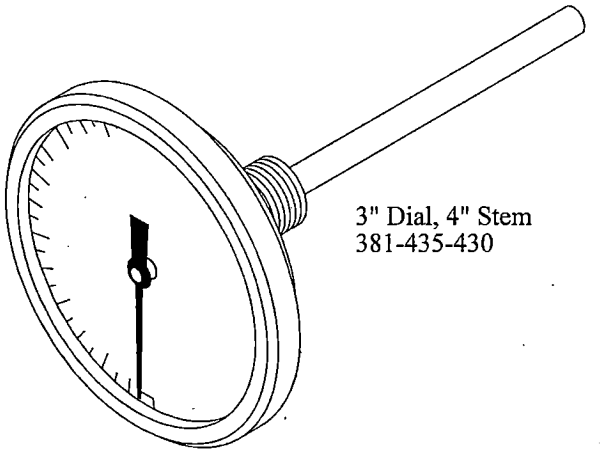
STANDARD GRADUATIONS AND DIAL SIZES

PRESSURE – PSI			COMPOUND – In. Hg.Vac. PSI			VACUUM – In. Hg.Vac. PSI		
RANGE	GRADUATIONS	FIGURE INTERVAL	RANGE	GRADUATIONS	FIGURE INTERVAL	RANGE	GRADUATIONS	FIGURE INTERVAL
0-15	0.5	1	30"-0-15	1"Hg.- 0.5 PSI	5"Hg.-3 PSI	30"-0	0.5 In. Hg.	5 In. Hg.
0-30	0.5	5	30"-0-30	1"Hg.- 1 PSI	10"Hg.-5 PSI			
0-60	1	5	30"-0-60	2"Hg.- 1 PSI	10"Hg.-10 PSI	DIAL SIZE - CATALOG NO.		
0-100	2	10	30"-0-100	5"Hg.- 2 PSI	15"Hg.-10 PSI	SIZE	PRESSURE	VACUUM	COMPOUND
0-160	5	20	30"-0-150	5"Hg.- 2 PSI	30"Hg.-20 PSI	1-1/2"	TL 15P	TL 15V	NA
0-200	5	20				2"	TL 20P	TL 20V	TL 20VP
0-300	5	30				2-1/2"	TL 25P	TL 25V	TL 25VP
0-400	10	50				3-1/2"	TL 35P	TL 35V	TL 35VP
0-600	10	50				4-1/2"	TL 45P	TL 45V	TL 45VP

TLG-885

KAESER COMPRESSORS

Kaeser Industrial Bimetal Thermometers 3" Dial



- Hermetically Sealed
- External Adjustment
- 1% full span accuracy
- All welded stainless steel construction
- Silicone on the coil provides vibration dampening and superior time response
- Heavy duty glass

Introduction

This series has a hermetic seal and an external adjustment in the rear of the case. All Kaeser Bimetal Thermometers have rear connections.
The hermetic seal is intended to prevent entry of moisture into the casing thus minimizing the possibility of icing or fogging inside the case. The window stays clear and precise readings are certain.

Temperature Ranges

Standard Fahrenheit ranges have been established to encompass all normal dryer temperature measurement requirements. A bi-metal thermometer can be used at an operating temperature anywhere throughout its dial range. Provision should be made for extreme temperature conditions.

Operating Conditions

Temperature of the case should be no more than 200°F,. Temperatures beyond this value may cause discoloration of the dial or result in increased pressure inside the casing which would ultimately lead to the failure of the window.

Kaeser Gauge Size Chart				
KAESER #	**Dial**	**Stem**	**Range**	**Usage**
381-435-430	3"	4"	50-550	Heater Outlet Temperature Gauge
381-345-010	3"	9"	50-550	Tower Temperature Gauge

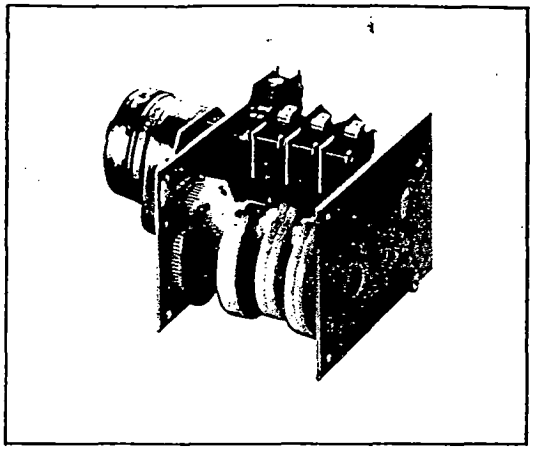
Warning: All gauge components should be selected considering media and ambient operating conditions to prevent misapplication. Improper application can be detrimental to the thermometer, cause failure, and possibly personal injury or property damage.
Thermowells: Thermowells must be used on any application where the stem of the bimetal thermometer may be exposed to pressure, corrosive fluids or high velocity. Additionally, the use of a thermowell permits instrument interchange or calibration without disturbing or closing down the process.

SERIES

atc 324 CAMTIME

PRECISION SWITCH CAM PROGRAMMER

A COMPACT AND ECONOMICAL MOTOR-DRIVEN CAM TIMER, THE 324C PRECISELY CONTROLS ONE TO TWELVE LOAD CIRCUITS THROUGH EASILY-SET SCREWDRIVER-ADJUSTABLE CAMS. EACH TIMER PROVIDES A WIDE RANGE OF CYCLE TIMES THROUGH A SET OF INTERCHANGEABLE GEARS. THE 324C CAN ALSO BE USED WITHOUT A MOTOR AS A ROTARY CAM LIMIT SWITCH WITH BIDIRECTIONAL SWITCHES.



PRODUCT HIGHLIGHTS*

EASY AND PRECISE CAM ADJUSTMENT

With ATC's unique split-cam design, each side of the cam is separately screwdriver-adjustable in either direction: either side determines the precise instant during the cycle when the switch will actuate, the other side determines how long the switch will remain actuated. Adjustments are easy and precise: 1/4 turn of the adjusting screw equals 1/2% of cycle time. A setting disc, calibrated in 1% increments, facilitates program set-up and indicates cycle progress.

APPROVALS
See Agency listing on inside back cover of catalog.

*For more information, ask for the T-2 catalog.

ONE TO TWELVE PRECISION SWITCHES

Whether used as a time or sequence programmer, the 324C can be ordered with any number of cam-operated switches from one to twelve. Each SPDT precision switch is rated at 10 amps, 120V AC and is 1/3 hp rated at 120 or 240V AC.

WIDE RANGE OF CYCLE TIMES

The 324C is available with a choice of 14 synchronous motors that provide more than 270 cycle times between 3 sec and 60 hrs. Each motor provides an adjustable range of 21 cycle times, with a ratio of over 2.5:1, through a set of interchangeable gears. Changing gears is a simple operation that takes only a few minutes.

TOP ACCURACY

The repeat accuracy and setting accuracy of the 324C are both within ± 1/4%, tops in its field. Follower fingers precisely track the contour of the cams, accurately operating the precision switches with quick-make and quick-break action.

SEQUENCE CONTROL

The 324C can be ordered without a motor and with a 1-inch long shaft extension on either or both ends, for use as a rotary cam limit switch. The unit is then fitted with bidirectional switches.

SPECIFICATIONS

CYCLE TIMES
More than 270 cycle times, from 3 sec to 60 hrs., from a choice of interchangeable motors and gears; each motor provides more than 20 cycle times.
(see Speed Charts).

REPEAT ACCURACY
± ¼ % of cycle time.

SETTING ACCURACY
± ¼ % of cycle time.

FRAME SIZES
3, 6, 9 and 12 cam fram sizes are provided

CAMS
NUMBER: 1 to 12 (or multiples up to 12, by combining timer assemblies); cams may be factory-set.
CUT: Standard or "50%" cut", as specified (standard cams allow contact closure adjustment of 1 to 45% or 55 to 99%, "50% cut" cams allow contact closure adjustment of 12 to 52% or 48 to 88%; custom cams available with 2, 3, 4 or more cuts.

CONSTRUCTION: Two-inch diameter; split type; made of Delrin.

LIFE EXPECTANCY
MECHANICAL: over 10,000,000 operations.
CONTACTS: over 1,000,000 operations at less than 1 amp.

LOAD SWITCHES
TYPE: Precision switches; one for each cam.
CONTACT ACTION: SPDT (Form C).
CONTACT RATING: 10 A at 120 V AC (non-inductive). ⅓ HP at 125/250 V AC.
MINIMUM CONTACT ACTUATION TIME: 1% of cycle time.

DRIVE MOTORS
SPEED: choice of 14 (see Time Cycle Ordering Codes).
TYPE: Synchronous; permanently lubricated; integral slip clutch for manual advance; anti-backup to prevent damage to switches.
VOLTAGE: 120V AC, 50 or 60 cycles; optional: 24 or 240 V AC, 50 or 60 cycles.
POWER CONSUMPTION: 12 watts max.
DUAL DRIVE: two motors may be used, for dual-speed and special applications:

TORQUE-SPEED CAPABILITIES: At cycle times of 30 sec or longer, the 324 can drive and switch 12 contacts simultaneously; below 30 sec, the motor may be limited in its ability to drive or switch a number of contacts simultaneously. (See speed chart tables).

TEMPERATURE RATING
32 to 140°F. (0 to 60°C.)

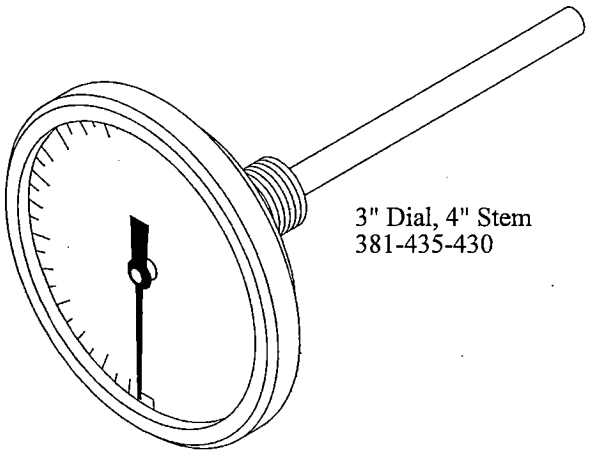
WEIGHT
NET: from 1 ½ lbs. for the 3 cam unit up to 3 ½ lbs. for the 12 cam unit.
SHIPPING: from two lbs. for the 3 cam unit up to 4 lbs. for the 12 cam unit.

ENCLOSURES (Optional)

NEMA 12 molded case for one model 324 with maximum of 3 cams.
(See Accessory section of catalog.)

KAESER COMPRESSORS

Kaeser Industrial Bimetal Thermometers 3" Dial



- Hermetically Sealed
- External Adjustment
- 1% full span accuracy
- All welded stainless steel construction
- Silicone on the coil provides vibration dampening and superior time response
- Heavy duty glass

Introduction

This series has a hermetic seal and an external adjustment in the rear of the case. All Kaeser Bimetal Thermometers have rear connections.

The hermetic seal is intended to prevent entry of moisture into the casing thus minimizing the possibility of icing or fogging inside the case. The window stays clear and precise readings are certain.

Temperature Ranges

Standard Fahrenheit ranges have been established to encompass all normal dryer temperature measurement requirements. A bi-metal thermometer can be used at an operating temperature anywhere throughout its dial range. Provision should be made for extreme temperature conditions.

Operating Conditions

Temperature of the case should be no more than 200°F,. Temperatures beyond this value may cause discoloration of the dial or result in increased pressure inside the casing which would ultimately lead to the failure of the window.

Kaeser Gauge Size Chart				
KAESER #	**Dial**	**Stem**	**Range**	**Usage**
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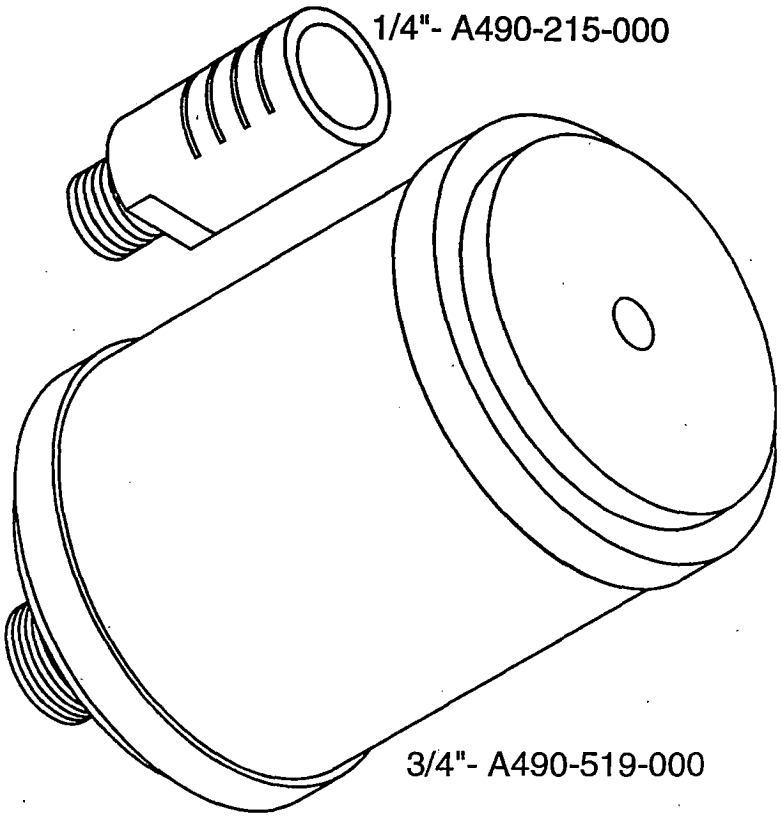
Warning: All gauge components should be selected considering media and ambient operating conditions to prevent misapplication. Improper application can be detrimental to the thermometer, cause failure, and possibly personal injury or property damage.

Thermowells: Thermowells must be used on any application where the stem of the bimetal thermometer may be exposed to pressure, corrosive fluids or high velocity. Additionally, the use of a thermowell permits instrument interchange or calibration without disturbing or closing down the process.

KAESER COMPRESSORS

Pneumatic Exhaust Silencers



APPLICATION

KAESER Silencers installed in the exhaust ports of pneumatic devices can be a quick and inexpensive way to help reduce work area noise; they also help to prevent contaminants from entering devices through exhaust ports.

FEATURES

- HIGH FLOW CAPACITY
- MINIMAL BACKPRESSURE
- CORROSION RESISTANT ALL-METAL CONSTRUCTION
- COMPACT SPACE-SAVING DESIGN
- HELPS PROTECT INSIDE OF DEVICE AGAINST CONTAMINATION THROUGH EXHAUST PORTS
- NPT THREADS STANDARD
- BSPT MALE THREADS AVAILABLE FOR BOTH MUFFLERS

SPECIFICATIONS

MAXIMUM RATED OPERATING CONDITIONS:
SUPPLY PRESSURE TO PNEUMATIC DEVICE: 300 psig (20.7 bar)
TEMPERATURE: 160ºF (71ºC)

WARNING

FLOW AND BACK PRESSURE MAY CHANGE WITH USE DUE TO POSSIBLE CONTAMINATION OF FILTER ELEMENT.

DIMENSIONS All dimensions in inches

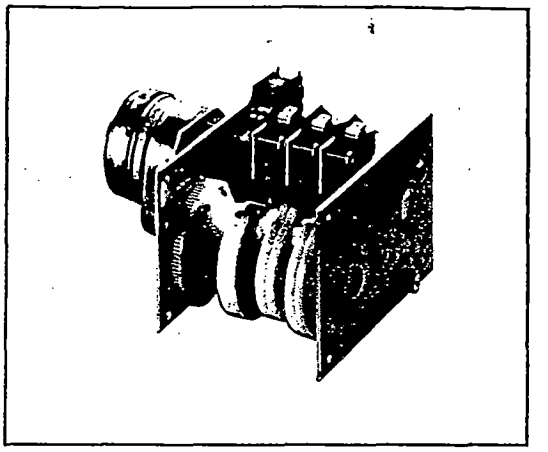
PIPE SIZE	PART #	DIA.	LENGTH	MATERIAL	WEIGHT	EXHAUST SURFACE AREA
1/4"	A490-215-000	13/16	2-3/16	Aluminum	.9 Oz.	5 in^2
3/4"	A490-519-000	3-3/8	6-3/4	Aluminum	.75 lb.	24.1 in^2
1"	A490-619-000	3-7/8	8	Aluminum	1.0 lb.	31.8 in^2
1-1/2"	A490-819-000	5-1/8	13-1/4	Aluminum	4.0 lb.	79.5 in^2
2"	A490-919-000	5-1/8	18-1/4	Aluminum	5.0 lb.	119.3 in^2

SERIES

atc 324 CAMTIME

PRECISION SWITCH CAM PROGRAMMER

A COMPACT AND ECONOMICAL MOTOR-DRIVEN CAM TIMER, THE 324C PRECISELY CONTROLS ONE TO TWELVE LOAD CIRCUITS THROUGH EASILY-SET SCREWDRIVER-ADJUSTABLE CAMS. EACH TIMER PROVIDES A WIDE RANGE OF CYCLE TIMES THROUGH A SET OF INTERCHANGEABLE GEARS. THE 324C CAN ALSO BE USED WITHOUT A MOTOR AS A ROTARY CAM LIMIT SWITCH WITH BIDIRECTIONAL SWITCHES.



PRODUCT HIGHLIGHTS*

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APPROVALS
See Agency listing on inside back cover of catalog.

*For more information, ask for the T-2 catalog.

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Whether used as a time or sequence programmer, the 324C can be ordered with any number of cam-operated switches from one to twelve. Each SPDT precision switch is rated at 10 amps, 120V AC and is 1/3 hp rated at 120 or 240V AC.

WIDE RANGE OF CYCLE TIMES

The 324C is available with a choice of 14 synchronous motors that provide more than 270 cycle times between 3 sec and 60 hrs. Each motor provides an adjustable range of 21 cycle times. with a ratio of over 2.5:1, through a set of interchangeable gears. Changing gears is a simple operation that takes only a few minutes.

TOP ACCURACY

The repeat accuracy and setting accuracy of the 324C are both within ± 1/4%, tops in its field. Follower fingers precisely track the contour of the cams, accurately operating the precision switches with quick-make and quick-break action.

SEQUENCE CONTROL

The 324C can be ordered without a motor and with a 1-inch long shaft extension on either or both ends, for use as a rotary cam limit switch. The unit is then fitted with bidirectional switches.

SPECIFICATIONS

CYCLE TIMES
More than 270 cycle times, from 3 sec to 60 hrs., from a choice of interchangeable motors and gears; each motor provides more than 20 cycle times.
(see Speed Charts).

REPEAT ACCURACY
± ¼ % of cycle time.

SETTING ACCURACY
± ¼ % of cycle time.

FRAME SIZES
3, 6, 9 and 12 cam fram sizes are provided

CAMS
NUMBER: 1 to 12 (or multiples up to 12, by combining timer assemblies); cams may be factory-set.
CUT: Standard or "50%" cut", as specified (standard cams allow contact closure adjustment of 1 to 45% or 55 to 99%, "50% cut" cams allow contact closure adjustment of 12 to 52% or 48 to 88%; custom cams available with 2, 3, 4 or more cuts.

CONSTRUCTION: Two-inch diameter; split type; made of Delrin.

LIFE EXPECTANCY
MECHANICAL: over 10,000,000 operations.
CONTACTS: over 1,000,000 operations at less than 1 amp.

LOAD SWITCHES
TYPE: Precision switches; one for each cam.
CONTACT ACTION: SPDT (Form C).
CONTACT RATING: 10 A at 120 V AC (non-inductive). ⅓ HP at 125/250 V AC.
MINIMUM CONTACT ACTUATION TIME: 1% of cycle time.

DRIVE MOTORS
SPEED: choice of 14 (see Time Cycle Ordering Codes).
TYPE: Synchronous; permanently lubricated; integral slip clutch for manual advance; anti-backup to prevent damage to switches.
VOLTAGE: 120V AC, 50 or 60 cycles; optional: 24 or 240 V AC, 50 or 60 cycles.
POWER CONSUMPTION: 12 watts max.
DUAL DRIVE: two motors may be used, for dual-speed and special applications:

TORQUE-SPEED CAPABILITIES: At cycle times of 30 sec or longer, the 324 can drive and switch 12 contacts simultaneously; below 30 sec, the motor may be limited in its ability to drive or switch a number of contacts simultaneously. (See speed chart tables).

TEMPERATURE RATING
32 to 140°F. (0 to 60°C.)

WEIGHT
NET: from 1 ½ lbs. for the 3 cam unit up to 3 ½ lbs. for the 12 cam unit.
SHIPPING: from two lbs. for the 3 cam unit up to 4 lbs. for the 12 cam unit.

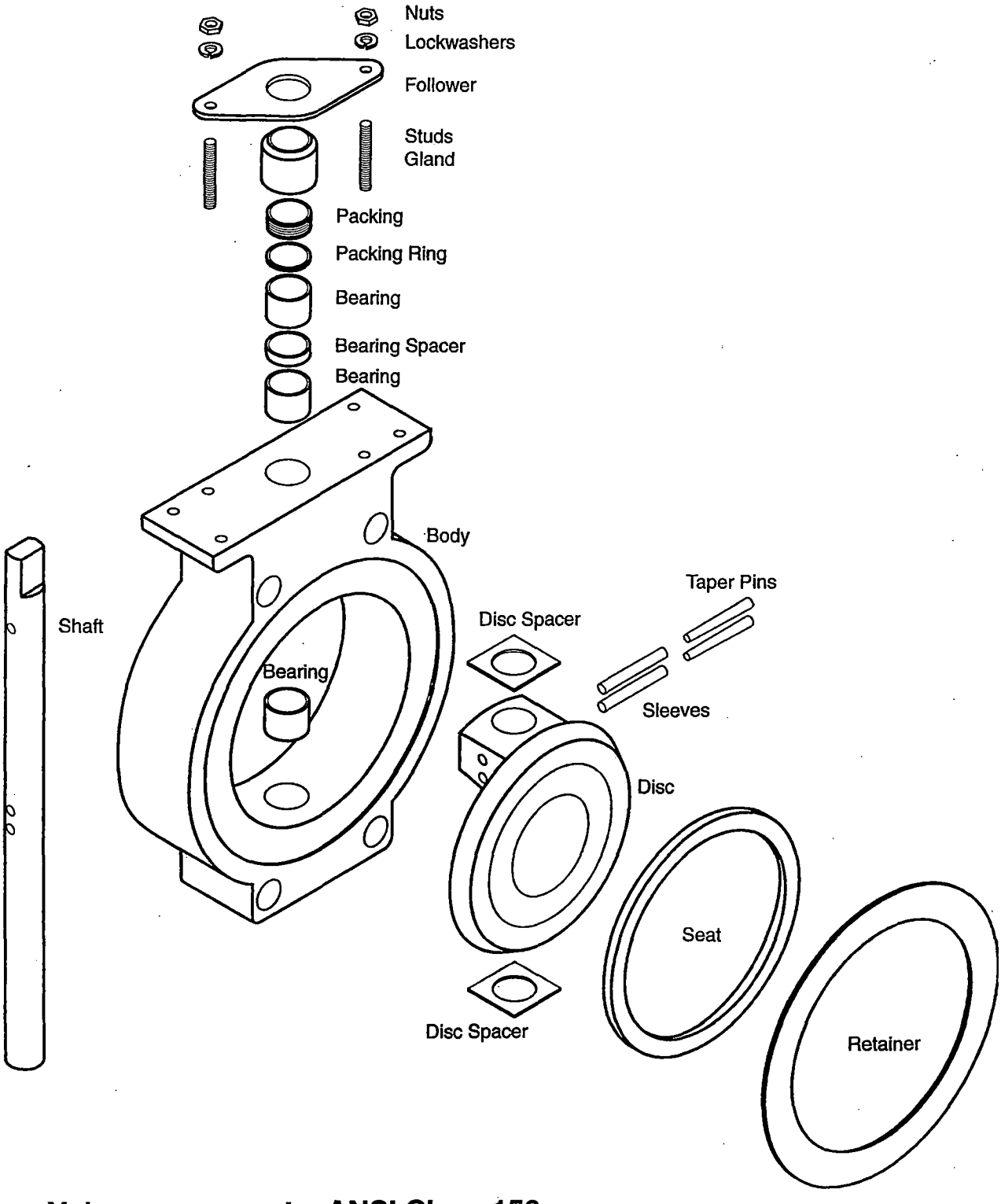
ENCLOSURES (Optional)

NEMA 12 molded case for one model 324 with maximum of 3 cams.
(See Accessory section of catalog.)

KAESER COMPRESSORS

Butterfly-type Valve with Vane-type Actuators

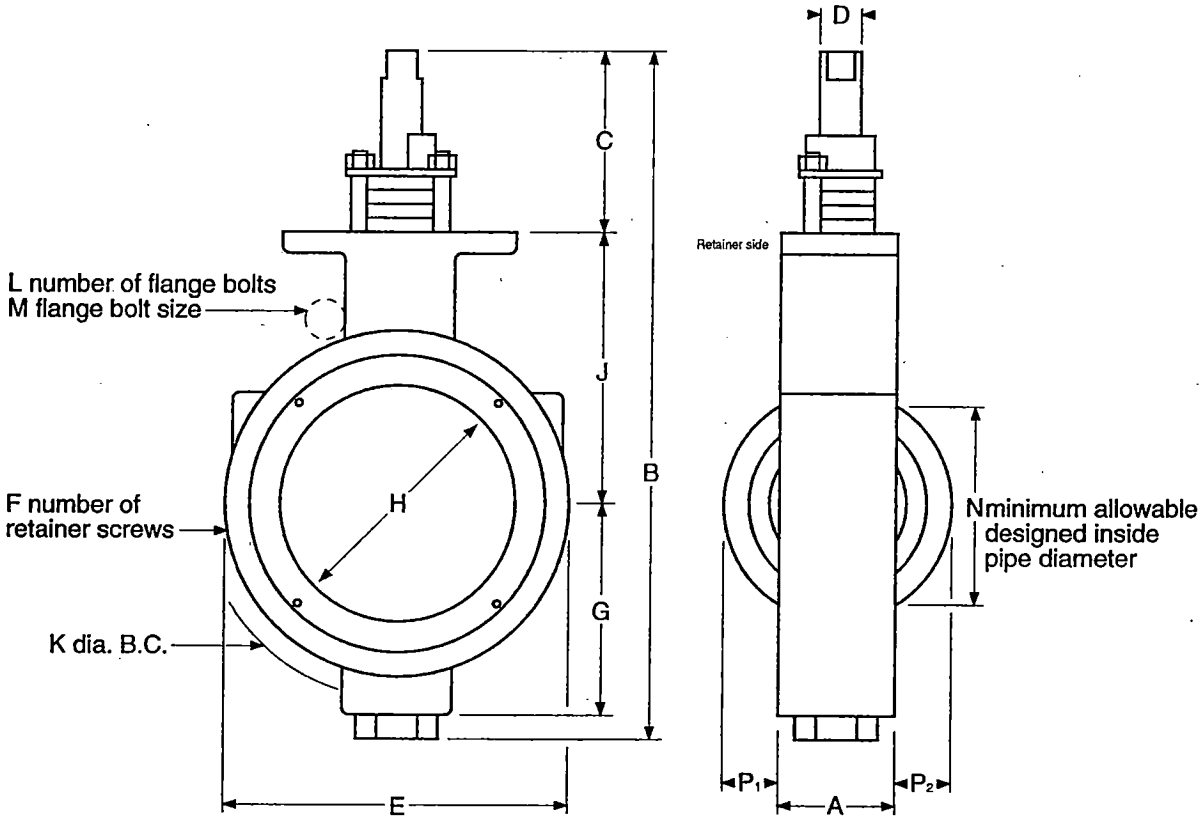
3" to 10"; 150# Design



Valve components, ANSI Class 150

KAESER COMPRESSORS

Butterfly-type Valve Dimensions



All Dimensions in Inches

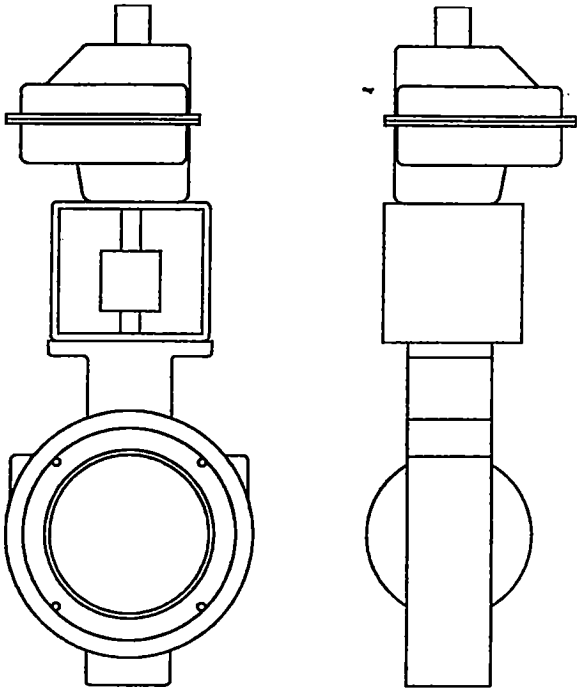
Valve size	A	B	C	D	E	F	G	H	J	K	L	M	N	P_1	P_2
3	1.88	10.62	3.25	.62	5.31	4	3.00	3.10	4.00	6.00	4	$^5/_8$-11	2.900	.710	.705
4	2.12	12.38	3.25	.75	6.25	4	3.81	4.02	4.88	7.50	8	$^5/_8$-11	3.826	1.019	1.024
6	2.25	14.50	3.25	1.00	8.50	4	4.78	5.75	6.00	9.50	8	$^3/_4$-10	5.769	1.723	1.913
8	2.50	16.71	3.25	1.25	10.62	4	5.78	7.47	7.12	11.75	8	$^3/_4$-10	7.625	2.448	2.648
10	2.81	20.71	3.50	1.50	12.75	8	7.59	9.27	9.00	14.25	12	$^7/_8$-9	9.564	3.143	3.473

Kaeser Compressor Part Numbers:

Valve size	Valve Part#	Valve with Actuator Part#	Valve Repair Kit Part#	Actuator Repair Kit Part#
3"	A730-729-280	A730-729-260	A730-729-210	A730-729-213
4"	A730-749-280	A730-749-260	A730-749-210	A730-729-213
6"	A730-759-280	A730-759-250	A730-759-210	A730-729-212
8"	A730-769-280	A730-769-250	A730-769-210	A730-729-215
10"	A730-779-280	A730-779-290	A730-779-210	A730-729-214

KAESER COMPRESSORS

90º Double Acting, Vane-type Actuators



Henderson Vane-type actuators provide efficient remote control for rotary operation of the butterfly valves used on larger air-dryers. They have been thoroughly tested and proven reliable over a wide range of pressures, temperatures, torques and cycling speeds.

Simple in design and reliable

(1) Only one moving part, the vane (paddle) is cast integral to the shaft--the force developed from the vane is transmitted directly to the valve, which means that no power is lost through transmittion. Moreover, this direct transmittion provides excellent repeatability when used with a positioner.

(2) Only three parts can wear--two shaft O-rings and the paddle O-ring. These O-rings are easily replaced and are available from the factory.

(3) Bronze bushings strengthen housing at the bearing area and prevent wear from side thrust.

(4) Nylon bearings equalize the compression of the O-ring around the vane, increasing O-ring life.

(5) External stroke adjustment--allows a wide range of vane travel.

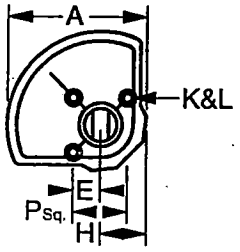
Additional features

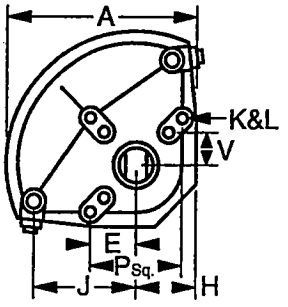
Compact, yet powerful. Because of simplicity in design, Henderson Vane-type actuators are much smaller than other types of actuators in the 210 inch pounds to 36,000 inch pounds range. Henderson vane actuators produce more torque per pound of weight than any other unit.
Constant torque output. The vane design provides a constant torque output throughout the stroke.
Die cast aluminum housing. Advanced process eliminates porosity and assures maximum strength. Special external coating resists atmospheric corrosion.
Modular construction. Any accessory control component can be added in the field.
Factory lubricated. All Henderson actuators are completely sealed and wheatherproofed.
100% inspection. Every actuator is completely inspected before shipment.
Long life. Exhaustive factory tests and customer applications subtantiate long life of Henderson actuators.
Ease of installation. Henderson actuators are easy to install because of their compact, lightweight design. Mounting kits for all types of valves and their accessories are available.
Fast, comprehensive service. Factory assistance can be provided whenever needed, including assistance with special applications, installation and maintenance.

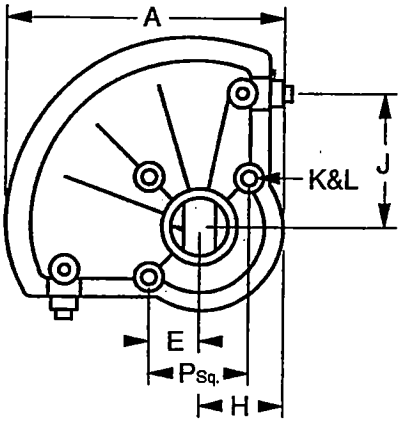
Repair Kit Features:

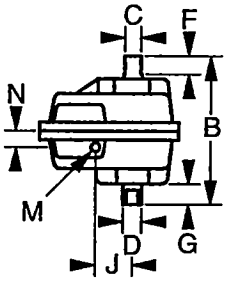
Complete spares for all wearing parts: Replacement parts for all O-rings, packing bearings,

Vane-type Actuator Dimensions

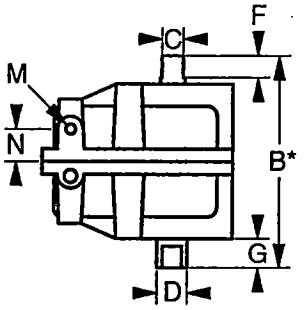




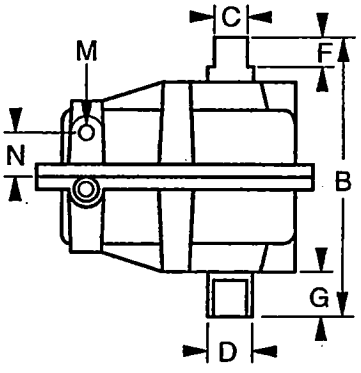




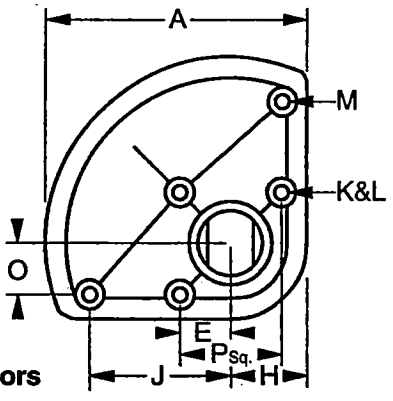
Model 60
for 3" and 4" valves



Model 200
for 6" valves

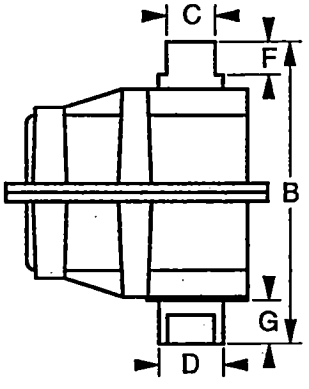


Model 450
for 8" valves



Standard letter designations for double acting, vane-type actuators

A overall length
B total height
C shaft end flats dimension
D shaft end diameter
E center line of vane shaft to center line of mounting holes
F depth of shaft end flats
G length of the shaft from the mounting surface to the end of the shaft
H center line of vane shaft to right end of vane
J center line of vane shaft to port centerline
K vane mounting holes dimensions and quantity
L vane mounting hole depth of thread
M port size
N center line of assembled vane to port center line
O center line of vane shaft to port center line
P vane mounting holes arrangement
R accessory mounting hole arrangement
S centerline of vane shaft to center line of accessory mounting hole
T accessory mounting hole dimension and quantity
U accessory mounting hole depth of thread
V center line of vane shaft to center line of inside mounting holes (model 200 only)
Note: Vane shown in full clockwise position when viewed from top of vane.



Model 750
for 10" valves

Vane-type Actuator Dimensions

Model		60	200	450	750
A	inch	4.87	6.94	9.25	9.31
	mm	124	176	235	236
B	inch	5.88	6.56	9.63	10.50
	mm	149	166	245	267
C*	inch	.568	.750	1.124	1.125
	mm	14.3	19.0	28.6	28.6
D*	inch	.875	1.064	1.437	1.442
	mm	22.2	27.0	36.5	36.6
E	inch	.94	1.50	1.75	1.75
	mm	24	38	44	44
F*	inch	.63	.75	1.13	1.13
	mm	16	19	29	29
G*	inch	.91	1.00	1.50	1.50
	mm	23	25	38	38
H	inch	1.69	2.13	2.88	2.63
	mm	43	54	74	67
J	inch	1.50	3.62	4.63	5.00
	mm	38	92	118	127
K*	inch (UNC)	$^5/_{16}$-18	$^3/_8$-16	$^1/_2$-13	$^1/_2$-13
	Qty.	3	6	3	3
L*	inch	.50	.56	.81	.75
	mm	13	.14	21	19
M*	inch (NPT)	$^1/_4$-18	$^1/_4$-18	$^1/_4$-18	$^1/_4$-18
	Qty.	1	2	2	2
N	inch	.50	.94	1.63	
	mm	13	24	41	
O	inch				1.75
	mm				44
P*	inch	1.88	3.00	3.50	3.50
	mm	48	76	89	89
V	inch		1.13		
	mm		28.6		

Weights

Model	60	200	450	750
lbs.	4	8	14	20

Operating torques

Model	PSI	40	60	80	100	120
	Bar	2.7	4.1	5.5	6.8	8.2
60	inch-lbs.	210	315	450	560	680
	Nm	24	36	51	63	77
200	inch-lbs.	680	1050	1450	1850	2200
	Nm	77	119	164	209	249
450	inch-lbs.	1800	270	3600	4500	5400
	Nm	203	305	407	508	610
750	inch-lbs.	2660	4100	5325	6900	8350
	Nm	300	463	602	780	943

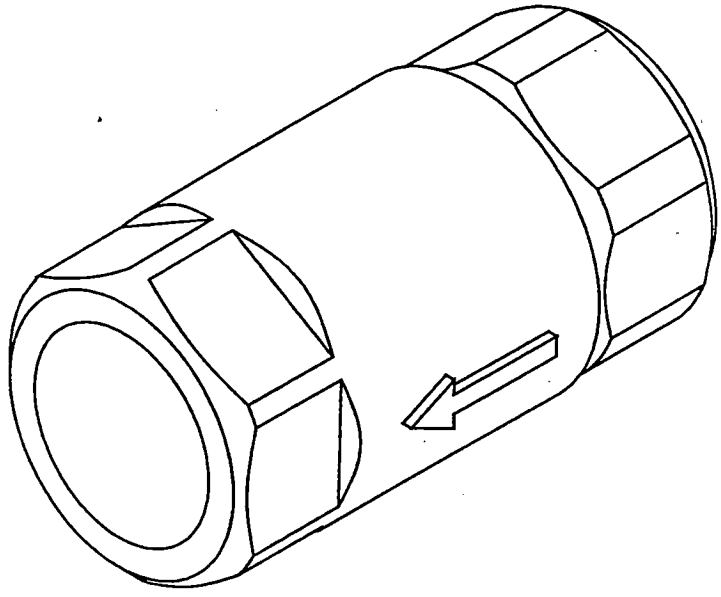
KAESER COMPRESSORS

Bronze Check Valve;

Threaded, 400 WOG, Cold, Non-Shock; 125 PSI Saturated Steam Spring Loaded Ball-Cone™ Check

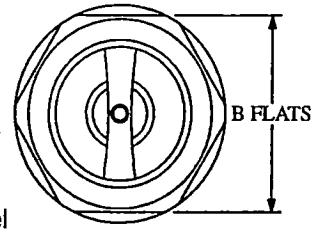
FEATURES

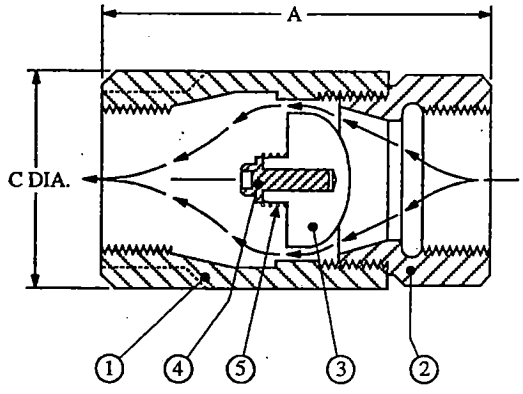
- Tight shutoff
- No radial alignment necessary
- Straight through streamlined for minimum change in velocity
- Vibration-free Ball-Cone™ check is spring-loaded for fast seating action



MATERIAL LIST

1.	Body	Bronze cast
2.	Tail Piece	
	(¼" – 1")	Bronze
	(1½ & 2")	Bronze cast
3.	Ball Check	Glass-filled TFE
4.	Guide	Brass
5.	Spring	316 Stainless Steel





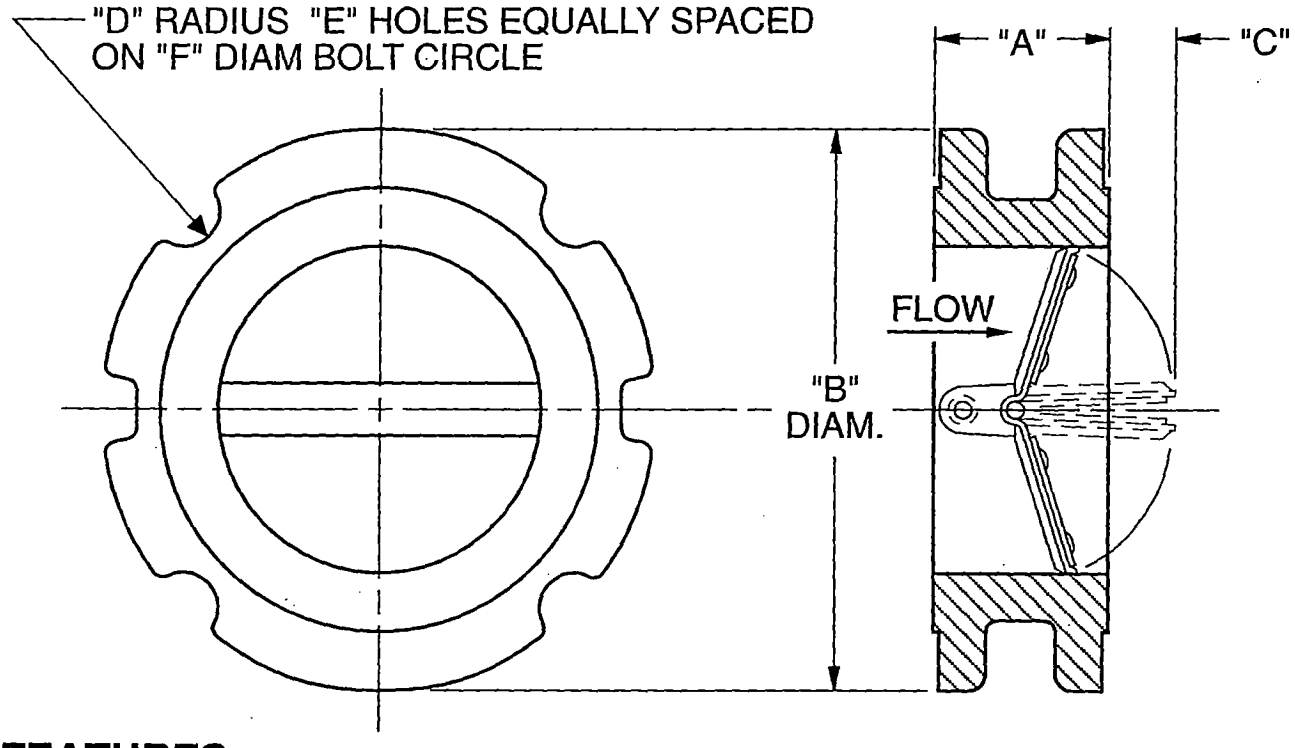
DIMENSIONS All dimensions in inches

PIPE SIZE	PART #	A	B	C	Cv*	Approx. Opening Pressure	Wt./100
¼"	A740-042-020	2-1/16	1-1/8	1-1/8	3	½ PSI	47
3/8"	A740-062-020	2-1/8	1-1/8	1-1/8	5	½ PSI	43
½"	A740-082-020	2-5/16	1-1/8	1-1/8	6	½ PSI	41
¾"	A740-102-020	2-7/8	1-3/8	1-½	12	½ PSI	84
1"	A740-122-020	3-½	1-¾	1-15/16	25	½ PSI	161
1½"	A740-162-020	4-15/16	2-½	2-13/16	65	½ PSI	442
2"	A740-182-020	6	3	3-11/16	120	½ PSI	760

* The Cv factor is the gallons of water per minute that the valve will pass with 1 PSI pressure drop with drop with valve fully open

KAESER COMPRESSORS

Wafer Check Valve;
125# Class

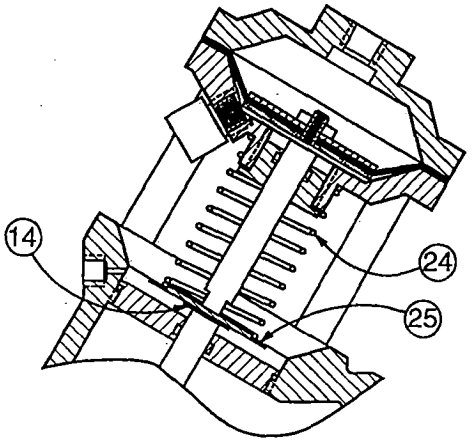


FEATURES

- Cast Iron Body with Aluminum Internals
- Silicone Sealing Components for Maximum Temperature Versatility
- 304 Stainless Steel Springs
- Standardized Maintenance Kit for Ease of Repair

DIMENSIONS All dimensions in inches

PIPE SIZE	PART #	"A"	"B"	"C"	"D"	"E"	"F"	REPAIR KIT PART #
3"	A740-248-830	1-7/8	6	11/16	3/8	4	6	A740-248-831
4"	A740-328-830	2-3/8	7-1/2	7/8	3/8	8	7-1/2	A740-328-831
6"	A740-348-830	3-3/8	9-1/2	1-1/2	7/16	8	9-1/2	A740-348-831
8"	A740-368-830	4-3/8	11-3/4	2-1/4	7/16	8	11-3/4	A740-368-831
10"	A740-388-830	5-3/8	14-1/4	2-1/2	1/2	12	14-1/4	A740-388-831

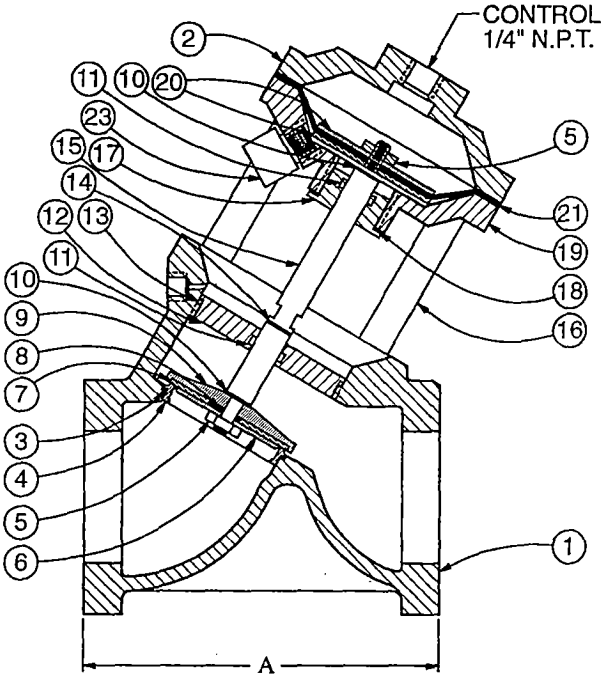


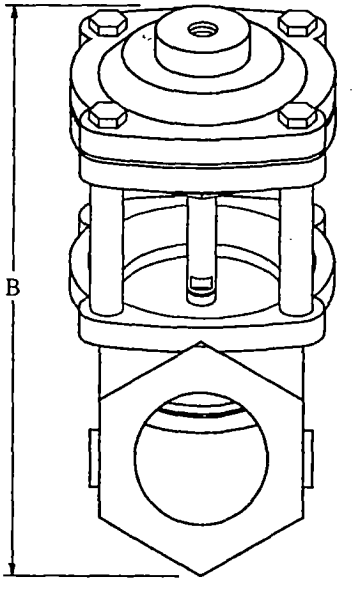
SPRING ASSIST CLOSE

KAESER COMPRESSORS

1½" ISOLATED BONNET DIAPHRAGM VALVE

SIZE	HECO NO.	"A"	"B"	UNITS
1½" NPT N.O.	A750-530-000	4.75"	5.37"	INCH
		120	136	mm
1½" NPT S.A.C.	A750-630-000	4.75"	7"	INCH
		120	136	mm





NORMALLY OPEN

ITEM NO.	DESCRIPTION	QTY.
1	BODY	1
2	CAP	1
3	SEAT GASKET	1
4	SEAT	1
5*	LOCK NUT	1
6	DISC PLATE	2
7*	DISC	1
8	DISC SPACER	1
9	DISC HOLDER	2
10*	STATIC GASKET	1
11*	DYNAMIC "O" RING	1
12	"O" RING RETAINER	1
13	RETAINER GASKET	1
14	RETAINING RING	1
15	SHAFT	1

ITEM NO.	DESCRIPTION	QTY.
16	STAND OFFS	4
17	GUIDE BUSHING	1
18	STATIC GASKET	6
19	BOTTOM CAP	6
20	DIAPHRAGM PLATE	2
21*	DIAPHRAGM	1
22	HEX NUTS	8
23	ELBOW (1/8" M X 1/4¼" F)	1

SPRING ASSIST CLOSE

24*	SPRING	1
25*	CENTERING PLATE	1

* Parts included in Repair Kit (A750-930-170)

KAESER COMPRESSORS

4-WAY SOLENOID VALVE

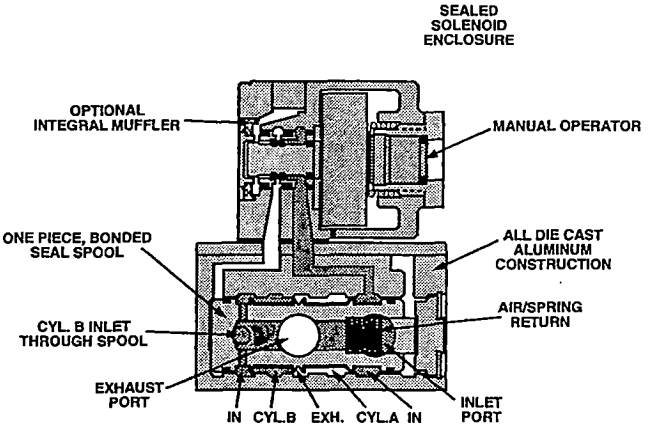
¼" NPT - C_v UP TO 1.4

PRESSURE RANGE: 10 TO 150 PSI

(SEE OPERATING DATA)

Single Coil: **A823-115-600**

Dual Coil: **A827-115-600**



2-POSITION, SINGLE SOLENOID, INDIVIDUAL BODY

FEATURES OF SOLENOID PILOT OPERATED VALVES

The solenoid versions feature:

- Air/spring return on single solenoid valves.
- Use for lube or non-lube service.
- Optional low wattage DC solenoids down to 1 watt.
- Various types of manual operators and electrical enclosures.
- NEMA 4 solenoid enclosure.

VALVE CONFIGURATIONS AVAILABLE

The solenoid pilot operated series is a small Inline 4-way valve with a C_v up to 1.4. This series provides fast response, long life and a high flow not commonly found in this size valve.

- 2-Position, single or double
- solenoid operator.
- Individual body or stacking body models.
- Manual and mechanical operators available.

SPECIAL APPLICATIONS:

On all models, energizing the "A" operator supplies pressure to cylinder port "A" and energizing the "B" operator supplies pressure to cylinder port "B"

For selector applications, additional piping considerations are required.

SELECTOR APPLICATIONS:

When using as a selector valve, connect the higher pressure to the Inlet port and the lower pressure to the Exhaust port.

On solenoid models, the inlet pressure must be a minimum of 25 PSI on singles or 10 PSI on doubles.

OPERATING DATA

PRESSURE RANGE

MAIN VALVE:

Single Solenoid, Spring Return	25 to 150 PSIG	Pressures shown are minimum and maximum safe working pressures.
Double Solenoid	10 to 150 PSIG	

FLOW CONSTANT:

	INDIVIDUAL	STACKING
¼"	1.2	1.4

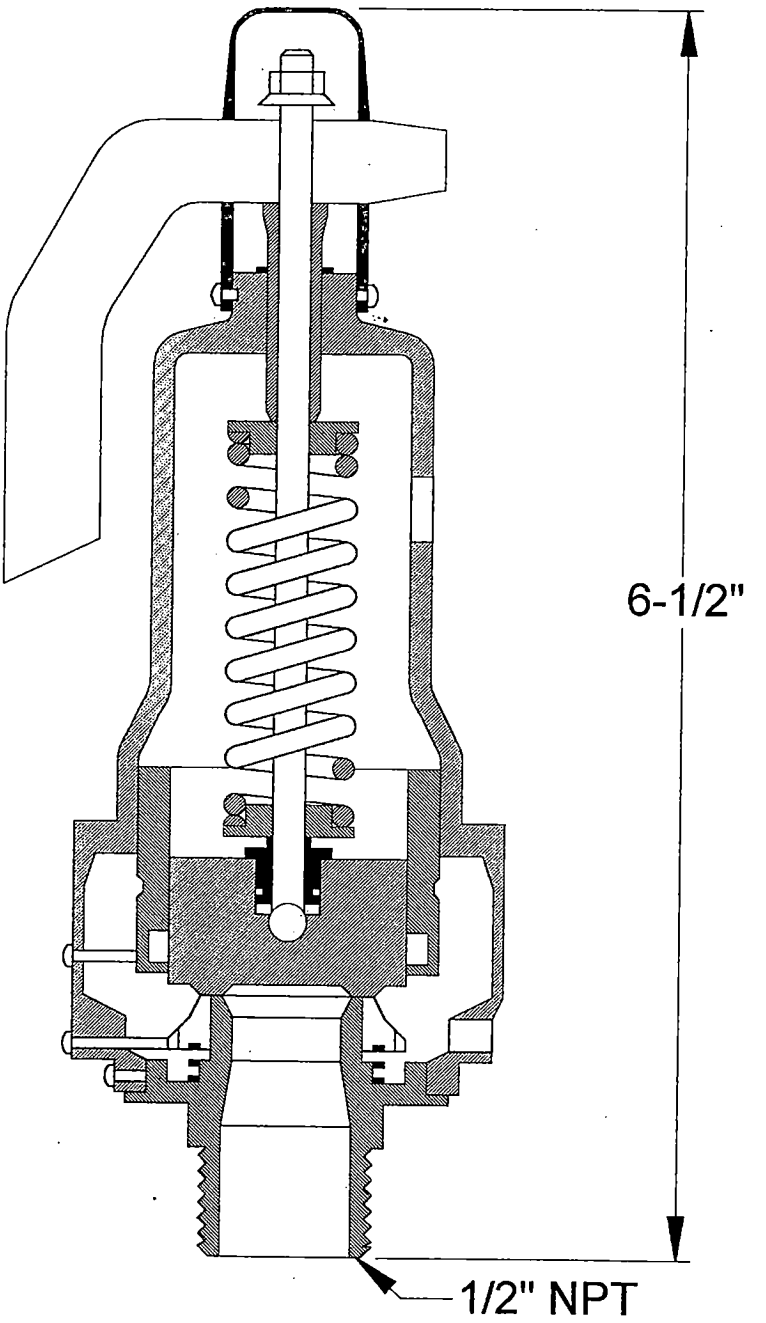
FLUIDS: Air or inert gases

LUBRICATION: Not required, but if lubrication is used, a medium range aniline oil is recommended.

AMBIENT TEMPERATURE RANGE: 0º to 120ºF (-18º to 50ºC.)

ELECTRICAL:

AC 120/60	Inrush	14.7 Volt-amps(.12 amps)
	Seal	10.4 Volt-amps(.09 amps)
DC 24 VOLTS	8.5, 6, 2.5 and 1 watt	
ABOVE COILS	General Purpose Class "A", continuous duty, encapsulated.	
LEADS:	#18 AWG X 18" Std.	



ASME CODE (UV) NATIONAL BOARD CERTIFIED
SET PRESSURE AT 150# STD.
MAXIMUM FLOW RATE: 350 SCFM

KAESER COMPRESSORS

KAESER AIR COMPRESSORS

SAFETY PRESSURE RELIEF VALVE

½" NPT

PART#: 840-311-590

PARTS LIST

MODEL NO.: KEP-1260Y4X
SERIAL NO.: 35400

ITEM NO.	QTY.	DESCRIPTION	PART NO.
1	2	Temperature Control, Thermostat, 120/240 VAC, 10 Amp, SPST	A090-471-080
2	1440 lbs	Dessicant, 3/16" Activated Alumina	A110-020-100
3	1	High Efficiency Filter, HEF-60, Pilot Air	A250-090-000
4	1	Orifice Union, 3/4", 3000# FS	A299-043-050
5	1	Fuse, 3 Amp 250 Volt	A350-190-300
6	3	Pressure Gauge, 3-1/2" Dial Panel Mount, 0-200 psi	A366-535-560
7	2	Temperature Gauge, 3" Dial, 1/2" NPT CBM, 9" Stem, 50-550°F	A381-345-010
8	1	Temperature Gauge, 3" Dial, 1/2" NPT CBM, 4" Stem, 50-550°F	A381-484-430
9	1	Light Base, Amber	A450-014-150
10	3	Solenoid Muffler, 1/4" MNPT	A490-215-000
11	2	Air Dryer Muffler. 1-1/2" MNPT	A490-719-000
12	1	Contactor, 25 amp, 3 Pole	A640-125-000
13	1	Contact Block, Selector Switch, NEMA 4	A680-707-030
14	1	Timer, 8 hour 6 Cam, 120/1/60	A690-450-100
15	2	Butterfly Valve, 3" 150# Wafer, w/MX-60 Actuator	A730-729-260
16	2	Check Valve, 3/4" NPT, Bronze Ball & Cone	A740-102-020
17	2	Check Valve, 3" Wafer, CI Body, SS Spring	A740-248-830
18	2	Diaphragm Valve, 1-1/2" NPT, Normally Open, Spring Assist Close, Hi-Temp	A750-630-000
19	2	Solenoid Valve, 4-Way Single Coil, 120V	A823-115-600
20	1	Solenoid Valve, 4-Way Dual Coil, 120V	A827-115-600
21	2	Pressure Relief Valve, 1/2" NPT Bronze, Set @ 150 psi	A840-311-590
22	1	Heater, 10 KW, 600/3/60, 14W/SQ.IN., NEMA 4	NPN-01

DATE: 7/13/99

SERIAL NUMBER: 35400

MODEL NUMBER: KEP-1260Y4X

THE FOLLOWING LIST ARE THE PARTS THAT MAKE UP THE

ANNUAL REPAIR KIT FOR: A151-200-ORK

F:	1	PILOT AIR FILTER MODEL NO.:	HEF-60	ELEMENT NO.:	16D33F	QTY:	2
		HECO NO.:	A250-090-000	HECO NO.:	A240-751-000		
F:		PRE-FILTER MODEL NO.:		ELEMENT NO.:		QTY:	
		HECO NO.:		HECO NO.:			
F:		AFTER-FILTER MODEL NO.:		ELEMENT NO.:		QTY:	
		HECO NO.:		HECO NO.:			
F:		SMA IN-LINE FILTER HECO NO:					
V:	1,2	VALVE HECO NO.:	A730-729-260	RK HECO NO.:	A730-729-210		
		DESC.:	VALVE, BUTTERFLY, 3" WAFER, 150# W/MX-60 ACTUATOR				
		MFR.:	XOMOX				
		MFR. PART NO.:	03-801-B-6-ST2-A-A	RK MFR. NO.:			
		ACT HECO NO.:		RK HECO NO.:	A730-729-213		
		DESC.:	ACTUATOR				
		MFR.:	XOMOX				
		MFR. PART NO.:	MX-60	RK MFR. NO.:			
V:	3,4	VALVE HECO NO.:	A750-630-000	RK HECO NO.:	A750-930-170		
		DESC.:	VALVE, DIAPHRAGM, N.O., 1-1/2" NPT HI-TEMP S.A.C.				
		MFR.:	AQUAMATIC				
		MFR. PART NO.:	V44E-0002-50000	RK MFR. NO.:	424-RAVFVJV		
		ACT HECO NO.:		RK HECO NO.:			
		DESC.:					
		MFR.:					
		MFR. PART NO.:		RK MFR. NO.:			

V:		VALVE HECO NO.:		RK HECO NO.:	
		DESC.:			
		MFR.:			
		MFR. PART NO.:		RK MFR. NO.:	
		ACT HECO NO.:		RK HECO NO.:	
		DESC.:			
		MFR.:			
		MFR. PART NO.:		RK MFR. NO.:	
V:		VALVE HECO NO.:		RK HECO NO.:	
		DESC.:			
		MFR.:			
		MFR. PART NO.:		RK MFR. NO.:	
		ACT HECO NO.:		RK HECO NO.:	
		DESC.:			
		MFR.:			
		MFR. PART NO.:		RK MFR. NO.:	
CV:	1,2	VALVE HECO NO.:	A740-248-830	RK HECO NO.:	A740-248-831
		DESC.:	CHECK VALVE, 3", INTERNALS		
		MFR.:	TECHNO		
		MFR. PART NO.:	5118-SS	RK MFR. NO.:	--
CV:	3,4	VALVE HECO NO.:	A740-102-020	RK HECO NO.:	A740-102-020
		DESC.:	CHECK VALVE, 3/4" BRONZE BALL & CONE, NO R.K. - REPLACE		
		MFR.:	CONBRACO		
		MFR. PART NO.:	61-104-01	RK MFR. NO.:	61-104-01

PRODUCT SPECIFICATION SHEET

MODEL:	REV:
120-1-Z155-056	-

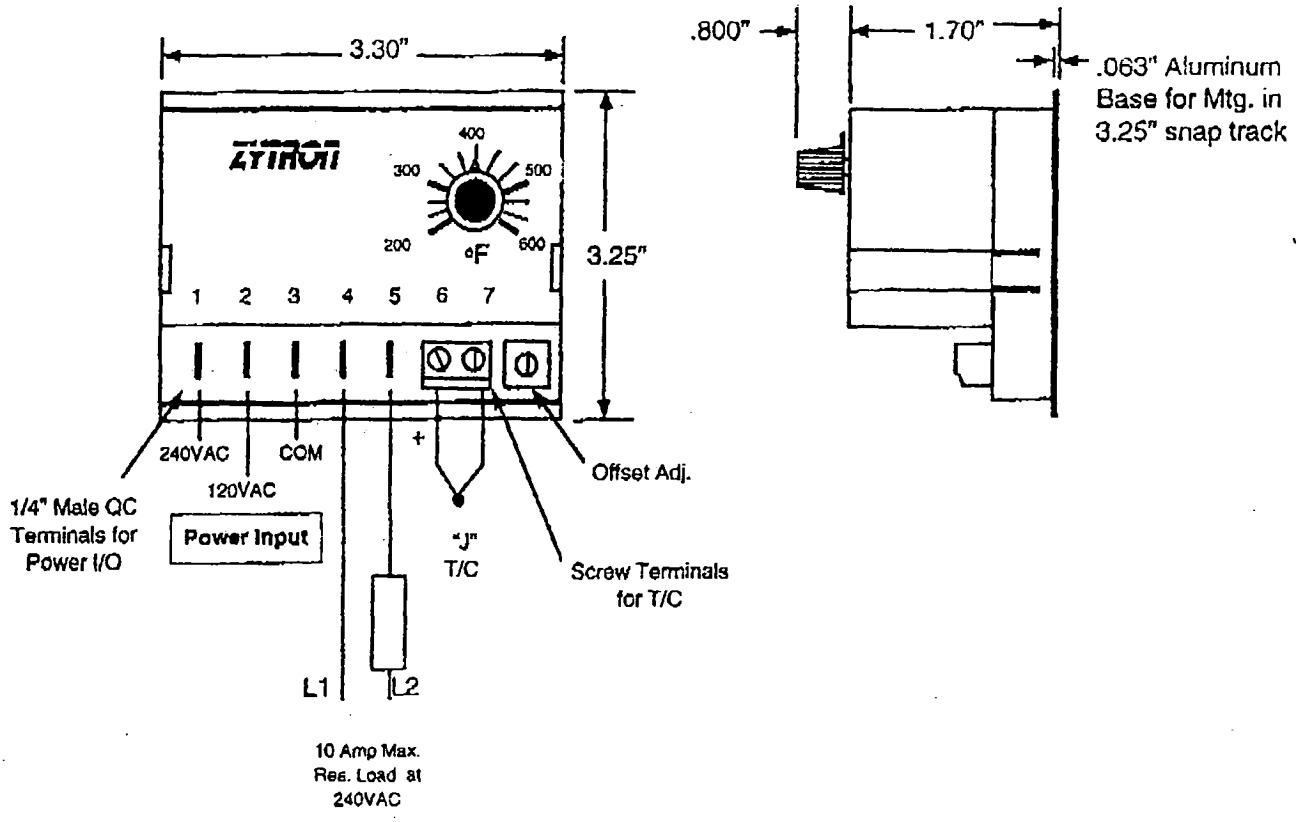
DESCRIPTION:	CUSTOMER PN:	DATE:
Snap Track Mtg. Local SP Thermocouple Controller	Lesman Instrument	4/12/96

Power Input:	120/240VAC ±10%, 50/60Hz, 3VA Max.
Control Output:	Relay, SPST, 10 Amp relay
Control Mode:	On-Off with 2°F Hysteresis typ. (relay contacts open-on-rise)
Setpoint Range:	200°F to 600°F
Sensor:	Type "J" Thermocouple
TC Break Protection:	Output de-energizes with TC break
Compensation:	Automatic cold junction compensation
Amb. Oper. Temp:	0 to 70°C (32 to 158°F)

MECHANICAL

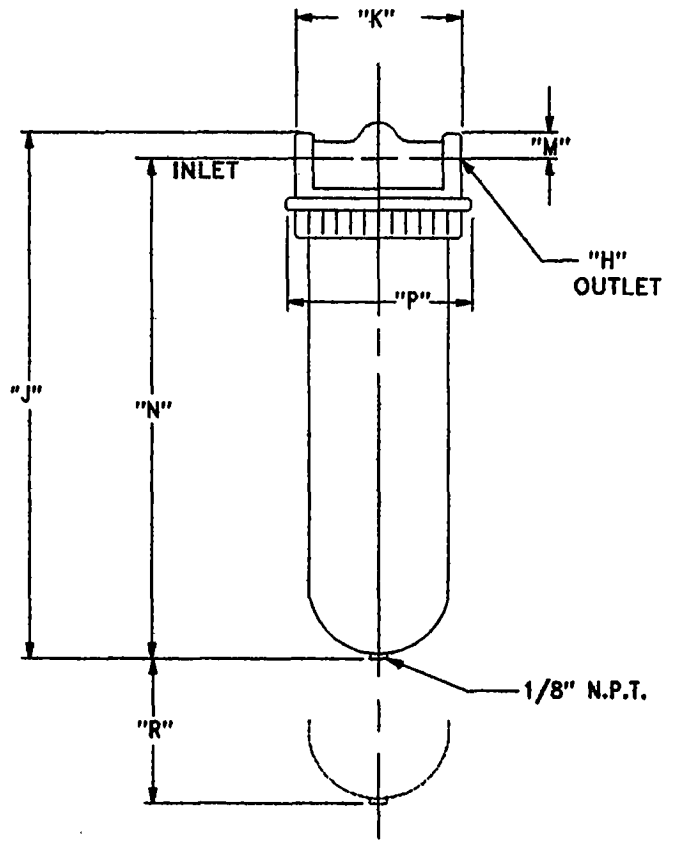
Enclosure Material:	Noryl, Black color
Field Terminations:	1/4" Male QC terminals for power input and relay output; miniature screw terminal block for TC connection.

DIMENSIONS:



LTR	DESCRIPTION	DATE

MODEL NO.	H PIPE SIZE	J	K	M	N	P	R ELEMENT REMOVAL CLEARANCE	WEIGHT	FILTER ELEMENT		MAXIMUM SUPPLY PRESSURE PSI	MAXIMUM OPERATING TEMP.	FILTER LENGTH
									ELEMENT NUMBER	QUANTITY			
HEF-60	3/4" N.P.T.	15 1/2"	4 1/2"	1"	14 1/2"	5"	4"	15	16D33F	1	300#	250 °F	4 1/2"



REV.	DATE	DESCRIPTION OF REVISION	APPROVED

KAESER COMPRESSORS

PILOT AIR FILTER
HEF-60

SCALE: NONE	DRAWN BY: ART	DATE: 9/8/98	APPROVED:
UNLESS SPECIFIED TOLERANCES ARE: FRACTIONS +/- 1/4" DECIMALS +/- .010	SERIAL NO.	DWG.NO. 55003-K	

TL Utility Gauges-Weiss Series TLG

APPLICATION

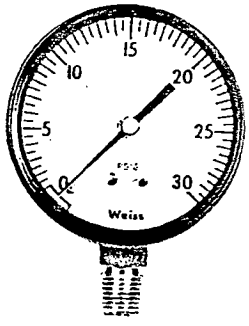
The Weiss series TL gauges are intended for general service conditions, for pressure or vacuum on air, oil, water, gas or other mediums that do not attack brass.

Steam service gauges should be protected from excessive temperature by installation of a syphon (coil type, Cat. No. SY14-S iron, or SY14-B brass).

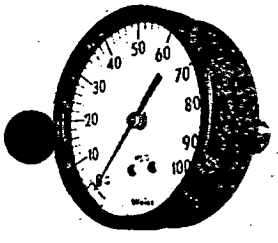
SPECIFICATIONS: CASE & RING- Drawn steel case with friction fitted steel ring, finished in black. BOURDON TUBE ASSEMBLY- Bronze, soft soldered to socket and tip. SOCKET- Brass bar stock 9/16" square wrench surface. 1/4" male NPT lower or back connection. 1/8" NPT also available on panel gauges and on special order. DIAL- White coated metal lithographed, with black graduation lines and numerals, dial mounted on socket, independent of case. MOVEMENT- All brass construction, precision gear and pinion. Mounted on socket independent of case. POINTER- Balanced design, aluminum in black finish. ACCURACY- 2% of the middle third of the entire range. ANSI-ASME B40.1 Grade B.

CASE STYLES

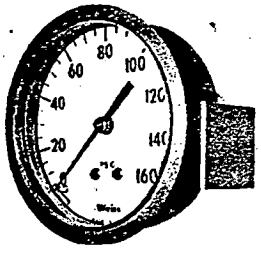
Black steel case, Standard. Stainless Steel and Plastic cases available on special order.



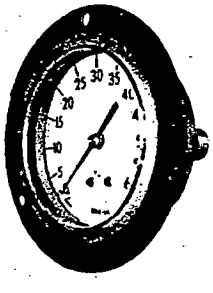
LOWER CONNECTION
SIZE 1-1/2, 2, 2-1/2, 3-1/2, 4-1/2"
THREADED CONNECTION 1/4" NPT (ON 1-1/2", 1/8" NPT ONLY)
FRICTION FITTED STEEL RING WITH PLASTIC WINDOW (GLASS ON 3-1/2" & 4-1/2")



DIRECT BACK CONNECTION
SIZE 1-1/2, 2, 2-1/2, 3-1/2"
THREADED CONNECTION 1/4" or 1/8"NPT
FRICTION FITTED STEEL RING WITH PLASTIC WINDOW (GLASS ON 3-1/2")



BACK CONNECTION "U" CLAMP MOUNT PANEL GAUGE
SIZE 1-1/2, 2, 2-1/2 "
THREADED CONNECTION 1/4" or 1/8"NPT (ON 1-1/2", 1/8" NPT ONLY)
PUSH-IN MOLDED ONE PIECE LEXAN WINDOW (STANDARD)



BACK CONNECTION "F" FRONT FLANGE PANEL GAUGE
SIZE 2, 2-1/2"
THREADED CONNECTION 1/4" or 1/8"NPT
PUSH-IN MOLDED ONE PIECE LEXAN WINDOW (STANDARD)

NOTE: FOR THERMOMETERS IN MATCHING CASE STYLES REFER TO 716-782 SPEC. SHEET. FOR "U" or "F" STYLE PANEL GAUGES, CHROME LIKE STAINLESS STEEL BEZELS AVAILABLE.

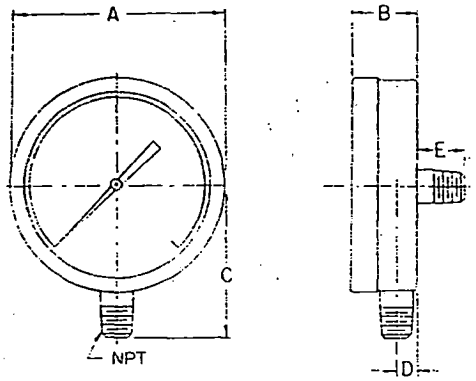
TO SPECIFY

Series TL	+	Dial Size	+	Pressure,	Vacuum	or	Compound	+	Case Style	+	NPT Size	+	Location	+	Range
TL		15, 20, 25, 35, 45		P	V		VP		"U" - U Clamp		1/8" or 1/4"		LM - Bottom		—
		1½, 2, 2½, 3½, 4½							"F" - Front Flange				CBM - Back		

EX: TL20P-U 1/4" CBM 0-15 PSI

WARNING: To prevent misapplication, media and ambient operating conditions should be considered when selecting pressure gauges. Improper gauge application can be detrimental, causing failure and possible property damage or personal injury. Additional information can be obtained by reading Pressure Gauge Standard ANSI/ASME B-40-1, available from the American Society of Mechanical Engineers, United Engineering Center, 345 East 47th St., New York, NY 10017.

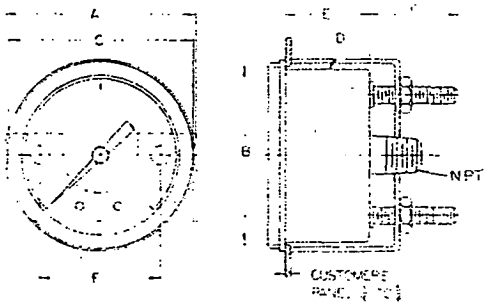
Case Dimensions



LOWER OR BACK CONNECTION

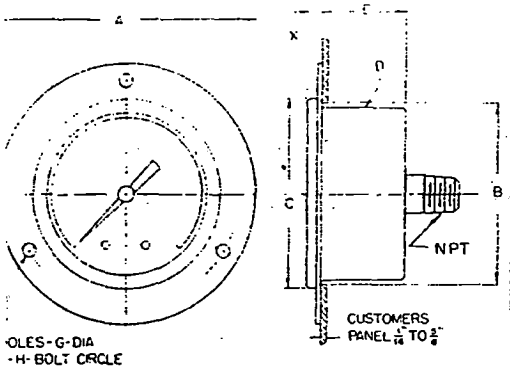
GAUGE SIZE	A	B	C	D	E	N.P.T.
1-1/2"	1-21/32	13/16	1-7/16	17/64	41/64	1/8
2"	2-1/16	1-1/8	1-7/8	3/8	7/8	1/4 or 1/8
2-1/2"	2-23/32	1-1/8	2-5/32	3/8	7/8	1/4 or 1/8
3-1/2"	3-11/16	1-1/8	2-5/8	3/8	7/8	1/4 or 1/8
4-1/2"	4-3/4	1-3/16	3-3/8	3/8	–	1/4

NOTE: 4½" available in lower connection, only.



U-CLAMP MOUNT

SIZE	A	B	C	D	E	F	G	H	X	N.P.T.
1-1/2"	1-53/64	1-5/8	1-21/32	1-19/32	1-35/64	1-1/8	–	–	7/64	1/8
2"	2-7/32	2-1/16	2-11/64	2-1/32	31/32	1-3/8	–	–	3/16	1/4 or 1/8
2-1/2"	2-13/16	2-11/16	2-15/16	2-19/32	1	2	–	–	3/16	1/4 or 1/8



FRONT FLANGE MOUNT

SIZE	A	B	C	D	E	F	G	H	X	N.P.T
2"	2-15/16	2-1/16	2-11/64	2-1/32	31/32	–	9/64	2-9/16	3/16	1/4 or 1/8
2-1/2"	3-11/16	2-11/16	2-15/16	2-19/32	1	–	11/64	3-5/16	3/16	1/4 or 1/8

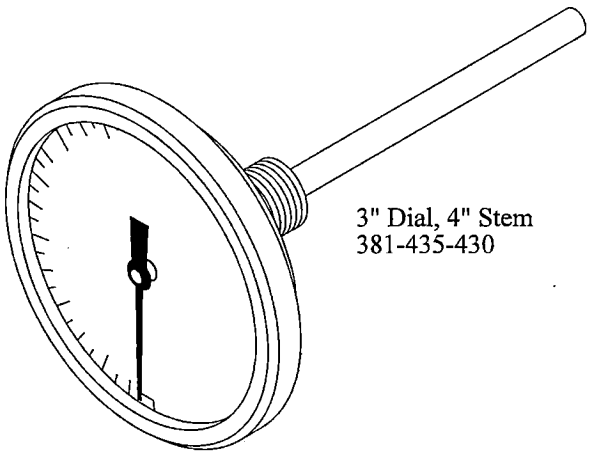
STANDARD GRADUATIONS AND DIAL SIZES

PRESSURE – PSI			COMPOUND – In. Hg.Vac. PSI			VACUUM – In. Hg.Vac. PSI		
RANGE	GRADUATIONS	FIGURE INTERVAL	RANGE	GRADUATIONS	FIGURE INTERVAL	RANGE	GRADUATIONS	FIGURE INTERVAL
0-15	0.5	1	30"-0-15	1"Hg.-0.5 PSI	5"Hg.-3 PSI	30"-0	0.5 In. Hg.	5 In. Hg.
0-30	0.5	5	30"-0-30	1"Hg.- 1 PSI	10"Hg.-5 PSI			
0-60	1	5	30"-0-60	2"Hg.- 1 PSI	10"Hg.-10 PSI	DIAL SIZE - CATALOG NO.		
0-100	2	10	30"-0-100	5"Hg.- 2 PSI	15"Hg.-10 PSI	SIZE	PRESSURE	VACUUM	COMPOUND
0-160	5	20	30"-0-150	5"Hg.- 2 PSI	30"Hg.-20 PSI	1-1/2"	TL 15P	TL 15V	NA
0-200	5	20				2"	TL 20P	TL 20V	TL 20VP
0-300	5	30				2-1/2"	TL 25P	TL 25V	TL 25VP
0-400	10	50				3-1/2"	TL 35P	TL 35V	TL 35VP
0-600	10	50				4-1/2"	TL 45P	TL 45V	TL 45VP

TLG-885

KAESER COMPRESSORS

Kaeser Industrial Bimetal Thermometers 3" Dial



- Hermetically Sealed
- External Adjustment
- 1% full span accuracy
- All welded stainless steel construction
- Silicone on the coil provides vibration dampening and superior time response
- Heavy duty glass

Introduction

This series has a hermetic seal and an external adjustment in the rear of the case. All Kaeser Bimetal Thermometers have rear connections.
The hermetic seal is intended to prevent entry of moisture into the casing thus minimizing the possibility of icing or fogging inside the case. The window stays clear and precise readings are certain.

Temperature Ranges

Standard Fahrenheit ranges have been established to encompass all normal dryer temperature measurement requirements. A bi-metal thermometer can be used at an operating temperature anywhere throughout its dial range. Provision should be made for extreme temperature conditions.

Operating Conditions

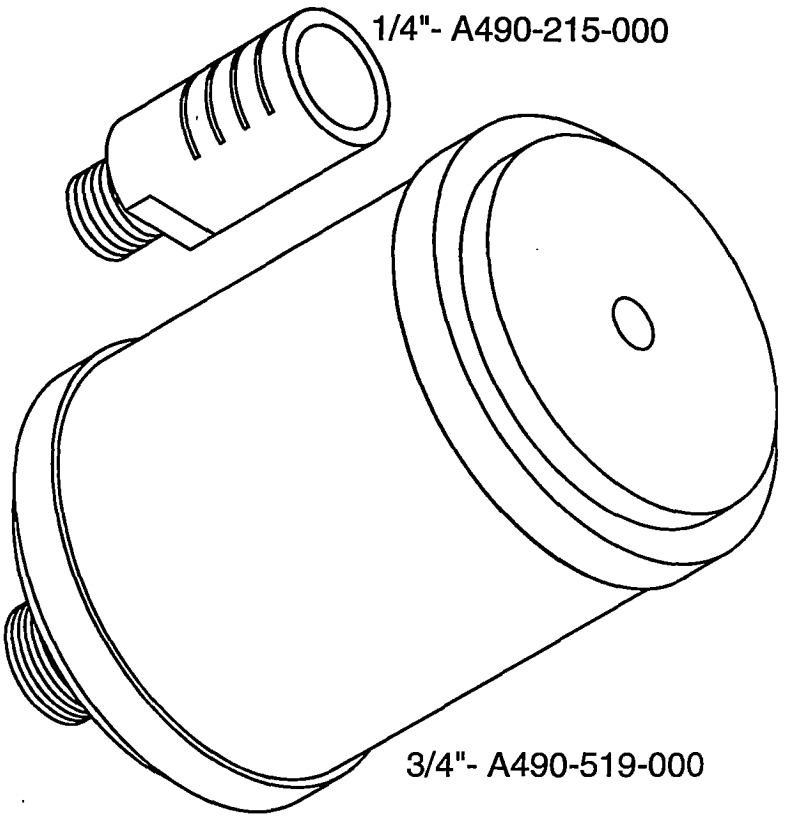
Temperature of the case should be no more than 200°F,. Temperatures beyond this value may cause discoloration of the dial or result in increased pressure inside the casing which would ultimately lead to the failure of the window.

Kaeser Gauge Size Chart				
KAESER #	**Dial**	**Stem**	**Range**	**Usage**
381-435-430	3"	4"	50-550	Heater Outlet Temperature Gauge
381-345-010	3"	9"	50-550	Tower Temperature Gauge

Warning: All gauge components should be selected considering media and ambient operating conditions to prevent misapplication. Improper application can be detrimental to the thermometer, cause failure, and possibly personal injury or property damage.
Thermowells: Thermowells must be used on any application where the stem of the bimetal thermometer may be exposed to pressure, corrosive fluids or high velocity. Additionally, the use of a thermowell permits instrument interchange or calibration without disturbing or closing down the process.

KAESER COMPRESSORS

Pneumatic Exhaust Silencers



APPLICATION

KAESER Silencers installed in the exhaust ports of pneumatic devices can be a quick and inexpensive way to help reduce work area noise; they also help to prevent contaminants from entering devices through exhaust ports.

FEATURES

- HIGH FLOW CAPACITY
- MINIMAL BACKPRESSURE
- CORROSION RESISTANT ALL-METAL CONSTRUCTION
- COMPACT SPACE-SAVING DESIGN
- HELPS PROTECT INSIDE OF DEVICE AGAINST CONTAMINATION THROUGH EXHAUST PORTS
- NPT THREADS STANDARD
- BSPT MALE THREADS AVAILABLE FOR BOTH MUFFLERS

SPECIFICATIONS

MAXIMUM RATED OPERATING CONDITIONS:
SUPPLY PRESSURE TO PNEUMATIC DEVICE: 300 psig (20.7 bar)
TEMPERATURE: 160ºF (71ºC)

WARNING

FLOW AND BACK PRESSURE MAY CHANGE WITH USE DUE TO POSSIBLE CONTAMINATION OF FILTER ELEMENT.

DIMENSIONS All dimensions in inches

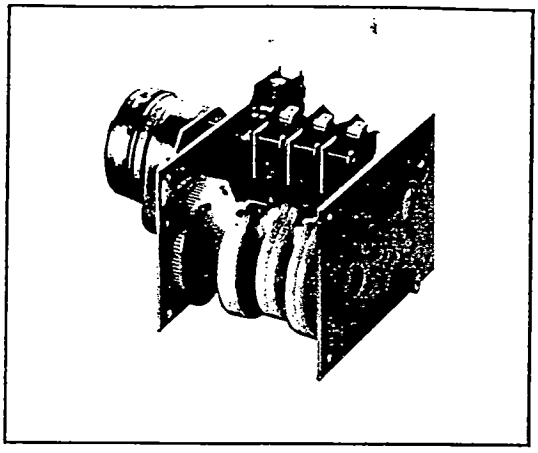
PIPE SIZE	PART #	DIA.	LENGTH	MATERIAL	WEIGHT	EXHAUST SURFACE AREA
1/4"	A490-215-000	13/16	2-3/16	Aluminum	.9 Oz.	5 in^2
3/4"	A490-519-000	3-3/8	6-3/4	Aluminum	.75 lb.	24.1 in^2
1"	A490-619-000	3-7/8	8	Aluminum	1.0 lb.	31.8 in^2
1-1/2"	A490-819-000	5-1/8	13-1/4	Aluminum	4.0 lb.	79.5 in^2
2"	A490-919-000	5-1/8	18-1/4	Aluminum	5.0 lb.	119.3 in^2

SERIES

atc 324 CAMTIME

PRECISION SWITCH CAM PROGRAMMER

A COMPACT AND ECONOMICAL MOTOR-DRIVEN CAM TIMER, THE 324C PRECISELY CONTROLS ONE TO TWELVE LOAD CIRCUITS THROUGH EASILY-SET SCREWDRIVER-ADJUSTABLE CAMS. EACH TIMER PROVIDES A WIDE RANGE OF CYCLE TIMES THROUGH A SET OF INTERCHANGEABLE GEARS. THE 324C CAN ALSO BE USED WITHOUT A MOTOR AS A ROTARY CAM LIMIT SWITCH WITH BIDIRECTIONAL SWITCHES.



PRODUCT HIGHLIGHTS*

EASY AND PRECISE CAM ADJUSTMENT

With ATC's unique split-cam design, each side of the cam is separately screwdriver-adjustable in either direction: either side determines the precise instant during the cycle when the switch will actuate, the other side determines how long the switch will remain actuated. Adjustments are easy and precise: 1/4 turn of the adjusting screw equals 1/2% of cycle time. A setting disc, calibrated in 1% increments, facilitates program set-up and indicates cycle progress.

APPROVALS
See Agency listing on inside back cover of catalog.

*For more information, ask for the T-2 catalog.

ONE TO TWELVE PRECISION SWITCHES

Whether used as a time or sequence programmer, the 324C can be ordered with any number of cam-operated switches from one to twelve. Each SPDT precision switch is rated at 10 amps, 120V AC and is 1/3 hp rated at 120 or 240V AC.

WIDE RANGE OF CYCLE TIMES

The 324C is available with a choice of 14 synchronous motors that provide more than 270 cycle times between 3 sec and 60 hrs. Each motor provides an adjustable range of 21 cycle times, with a ratio of over 2.5:1, through a set of interchangeable gears. Changing gears is a simple operation that takes only a few minutes.

TOP ACCURACY

The repeat accuracy and setting accuracy of the 324C are both within ± 1/4%, tops in its field. Follower fingers precisely track the contour of the cams, accurately operating the precision switches with quick-make and quick-break action.

SEQUENCE CONTROL

The 324C can be ordered without a motor and with a 1-inch long shaft extension on either or both ends, for use as a rotary cam limit switch. The unit is then fitted with bidirectional switches.

SPECIFICATIONS

CYCLE TIMES
More than 270 cycle times, from 3 sec to 60 hrs., from a choice of interchangeable motors and gears; each motor provides more than 20 cycle times.
(see Speed Charts).

REPEAT ACCURACY
± ¼ % of cycle time.

SETTING ACCURACY
± ¼ % of cycle time.

FRAME SIZES
3, 6, 9 and 12 cam fram sizes are provided

CAMS
NUMBER: 1 to 12 (or multiples up to 12, by combining timer assemblies); cams may be factory-set.
CUT: Standard or "50%" cut", as specified (standard cams allow contact closure adjustment of 1 to 45% or 55 to 99%, "50% cut" cams allow contact closure adjustment of 12 to 52% or 48 to 88%; custom cams available with 2, 3, 4 or more cuts.

CONSTRUCTION: Two-inch diameter; split type; made of Delrin.

LIFE EXPECTANCY
MECHANICAL: over 10,000,000 operations.
CONTACTS: over 1,000,000 operations at less than 1 amp.

LOAD SWITCHES
TYPE: Precision switches; one for each cam.
CONTACT ACTION: SPDT (Form C).
CONTACT RATING: 10 A at 120 V AC (non-inductive). ⅓ HP at 125/250 V AC.
MINIMUM CONTACT ACTUATION TIME: 1% of cycle time.

DRIVE MOTORS
SPEED: choice of 14 (see Time Cycle Ordering Codes).
TYPE: Synchronous; permanently lubricated; integral slip clutch for manual advance; anti-backup to prevent damage to switches.
VOLTAGE: 120V AC, 50 or 60 cycles; optional: 24 or 240 V AC, 50 or 60 cycles.
POWER CONSUMPTION: 12 watts max.
DUAL DRIVE: two motors may be used, for dual-speed and special applications:

TORQUE-SPEED CAPABILITIES: At cycle times of 30 sec or longer, the 324 can drive and switch 12 contacts simultaneously; below 30 sec, the motor may be limited in its ability to drive or switch a number of contacts simultaneously. (See speed chart tables).

TEMPERATURE RATING
32 to 140°F. (0 to 60°C.)

WEIGHT
NET: from 1 ½ lbs. for the 3 cam unit up to 3 ½ lbs. for the 12 cam unit.
SHIPPING: from two lbs. for the 3 cam unit up to 4 lbs. for the 12 cam unit.

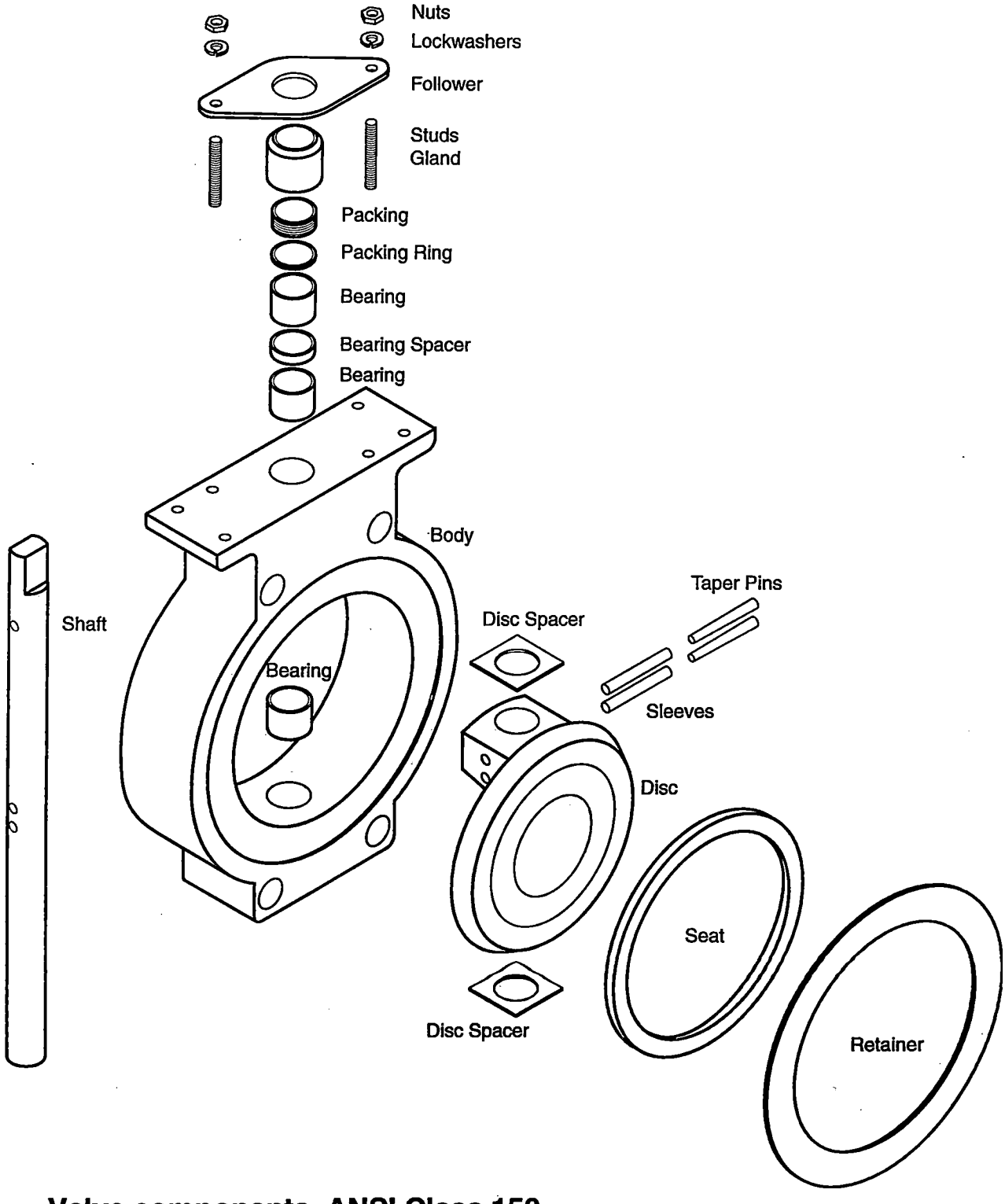
ENCLOSURES (Optional)

NEMA 12 molded case for one model 324 with maximum of 3 cams.
(See Accessory section of catalog.)

KAESER COMPRESSORS

Butterfly-type Valve with Vane-type Actuators

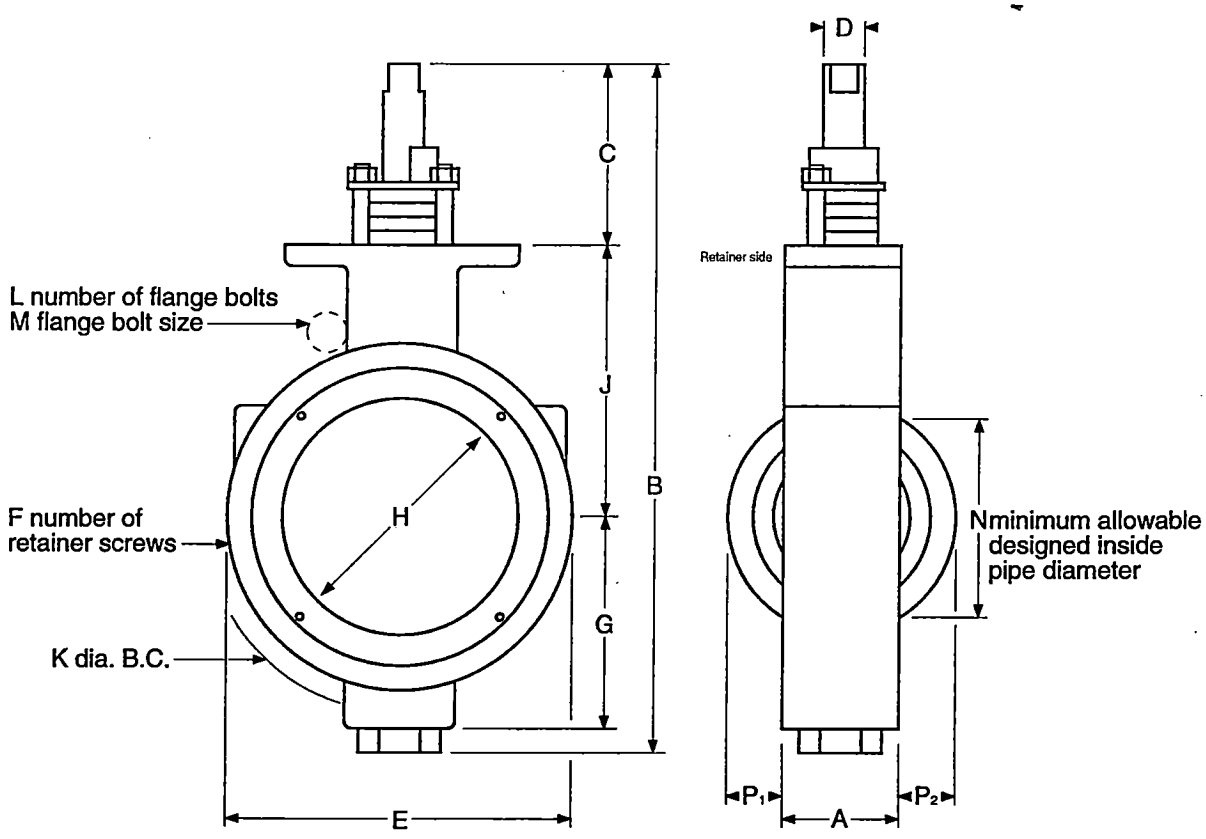
3" to 10"; 150# Design



Valve components, ANSI Class 150

KAESER COMPRESSORS

Butterfly-type Valve Dimensions



All Dimensions in Inches

Valve size	A	B	C	D	E	F	G	H	J	K	L	M	N	P_1	P_2
3	1.88	10.62	3.25	.62	5.31	4	3.00	3.10	4.00	6.00	4	$^5/_8$-11	2.900	.710	.705
4	2.12	12.38	3.25	.75	6.25	4	3.81	4.02	4.88	7.50	8	$^5/_8$-11	3.826	1.019	1.024
6	2.25	14.50	3.25	1.00	8.50	4	4.78	5.75	6.00	9.50	8	$^3/_4$-10	5.769	1.723	1.913
8	2.50	16.71	3.25	1.25	10.62	4	5.78	7.47	7.12	11.75	8	$^3/_4$-10	7.625	2.448	2.648
10	2.81	20.71	3.50	1.50	12.75	8	7.59	9.27	9.00	14.25	12	$^7/_8$-9	9.564	3.143	3.473

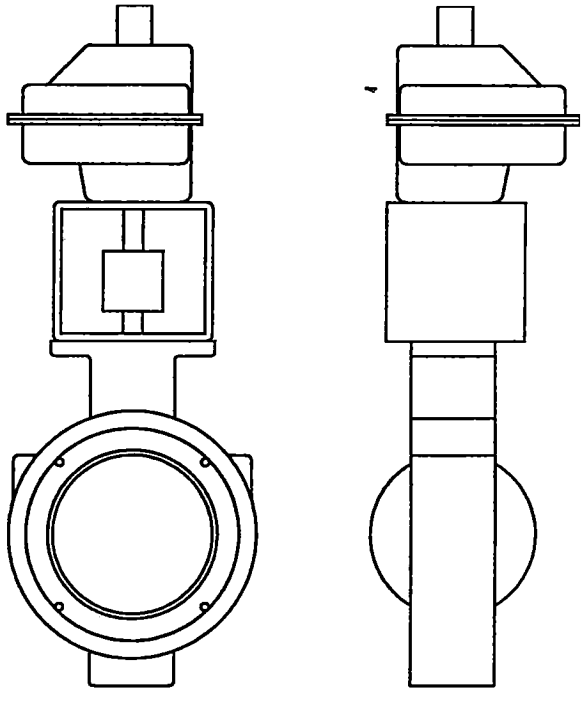
Kaeser Compressor Part Numbers:

Valve size	Valve Part#	Valve with Actuator Part#	Valve Repair Kit Part#	Actuator Repair Kit Part#
3"	A730-729-280	A730-729-260	A730-729-210	A730-729-213
4"	A730-749-280	A730-749-260	A730-749-210	A730-729-213
6"	A730-759-280	A730-759-250	A730-759-210	A730-729-212
8"	A730-769-280	A730-769-250	A730-769-210	A730-729-215
10"	A730-779-280	A730-779-290	A730-779-210	A730-729-214

KAESER COMPRESSORS

90º Double Acting, Vane-type Actuators

Henderson Vane-type actuators provide efficient remote control for rotary operation of the butterfly valves used on larger air-dryers. They have been thoroughly tested and proven reliable over a wide range of pressures, temperatures, torques and cycling speeds.



Simple in design and reliable

(1) Only one moving part, the vane (paddle) is cast integral to the shaft--the force developed from the vane is transmitted directly to the valve, which means that no power is lost through transmittion. Moreover, this direct transmittion provides excellent repeatability when used with a positioner.

(2) Only three parts can wear--two shaft O-rings and the paddle O-ring. These O-rings are easily replaced and are available from the factory.

(3) Bronze bushings strengthen housing at the bearing area and prevent wear from side thrust.

(4) Nylon bearings equalize the compression of the O-ring around the vane, increasing O-ring life.

(5) External stroke adjustment--allows a wide range of vane travel.

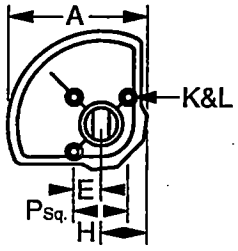
Additional features

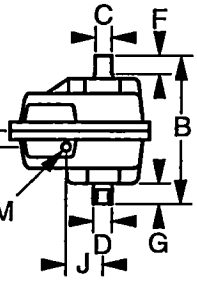
Compact, yet powerful. Because of simplicity in design, Henderson Vane-type actuators are much smaller than other types of actuators in the 210 inch pounds to 36,000 inch pounds range. Henderson vane actuators produce more torque per pound of weight than any other unit.
Constant torque output. The vane design provides a constant torque output throughout the stroke.
Die cast aluminum housing. Advanced process eliminates porosity and assures maximum strength. Special external coating resists atmospheric corrosion.
Modular construction. Any accessory control component can be added in the field.
Factory lubricated. All Henderson actuators are completely sealed and wheatherproofed.
100% inspection. Every actuator is completely inspected before shipment.
Long life. Exhaustive factory tests and customer applications subtantiate long life of Henderson actuators.
Ease of installation. Henderson actuators are easy to install because of their compact, lightweight design. Mounting kits for all types of valves and their accessories are available.
Fast, comprehensive service. Factory assistance can be provided whenever needed, including assistance with special applications, installation and maintenance.

Repair Kit Features:

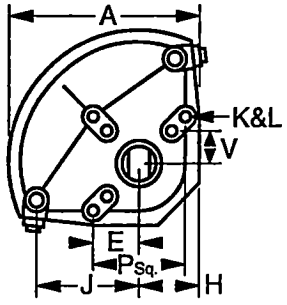
Complete spares for all wearing parts: Replacement parts for all O-rings, packing bearings,

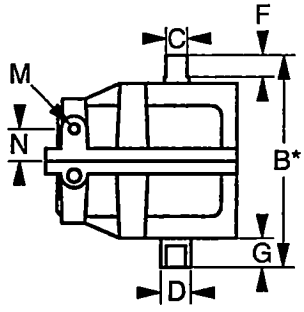
Vane-type Actuator Dimensions



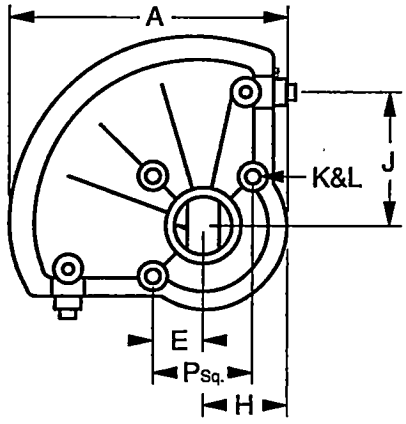


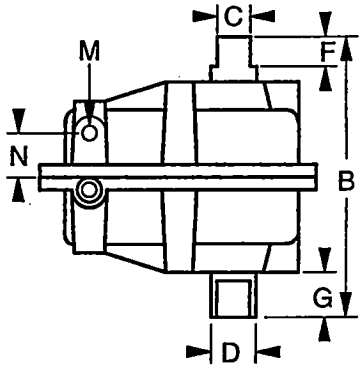
Model 60
for 3" and 4" valves



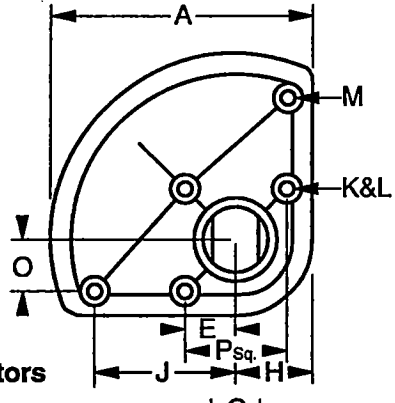


Model 200
for 6" valves



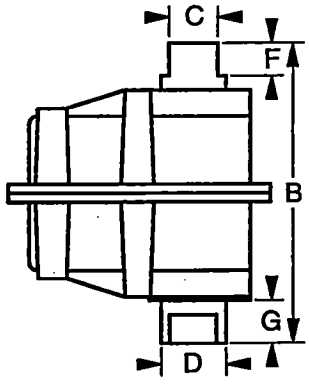


Model 450
for 8" valves



Standard letter designations for double acting, vane-type actuators

A overall length
B total height
C shaft end flats dimension
D shaft end diameter
E center line of vane shaft to center line of mounting holes
F depth of shaft end flats
G length of the shaft from the mounting surface to the end of the shaft
H center line of vane shaft to right end of vane
J center line of vane shaft to port centerline
K vane mounting holes dimensions and quantity
L vane mounting hole depth of thread
M port size
N center line of assembled vane to port center line
O center line of vane shaft to port center line
P vane mounting holes arrangement
R accessory mounting hole arrangement
S centerline of vane shaft to center line of accessory mounting hole
T accessory mounting hole dimension and quantity
U accessory mounting hole depth of thread
V center line of vane shaft to center line of inside mounting holes (model 200 only)
Note: Vane shown in full clockwise position when viewed from top of vane.



Model 750
for 10" valves

Vane-type Actuator Dimensions

Model		60	200	450	750
A	inch	4.87	6.94	9.25	9.31
	mm	124	176	235	236
B	inch	5.88	6.56	9.63	10.50
	mm	149	166	245	267
C*	inch	.568	.750	1.124	1.125
	mm	14.3	19.0	28.6	28.6
D*	inch	.875	1.064	1.437	1.442
	mm	22.2	27.0	36.5	36.6
E	inch	.94	1.50	1.75	1.75
	mm	24	38	44	44
F*	inch	.63	.75	1.13	1.13
	mm	16	19	29	29
G*	inch	.91	1.00	1.50	1.50
	mm	23	25	38	38
H	inch	1.69	2.13	2.88	2.63
	mm	43	54	74	67
J	inch	1.50	3.62	4.63	5.00
	mm	38	92	118	127
K*	inch (UNC)	5/16-18	3/8-16	1/2-13	1/2-13
	Qty.	3	6	3	3
L*	inch	.50	.56	.81	.75
	mm	13	.14	21	19
M*	inch (NPT)	1/4-18	1/4-18	1/4-18	1/4-18
	Qty.	1	2	2	2
N	inch	.50	.94	1.63	
	mm	13	24	41	
O	inch				1.75
	mm				44
P*	inch	1.88	3.00	3.50	3.50
	mm	48	76	89	89
V	inch		1.13		
	mm		28.6		

Weights

Model	60	200	450	750
lbs.	4	8	14	20

Operating torques

Model	PSI	40	60	80	100	120
	Bar	2.7	4.1	5.5	6.8	8.2
60	inch-lbs.	210	315	450	560	680
	Nm	24	36	51	63	77
200	inch-lbs.	680	1050	1450	1850	2200
	Nm	77	119	164	209	249
450	inch-lbs.	1800	270	3600	4500	5400
	Nm	203	305	407	508	610
750	inch-lbs.	2660	4100	5325	6900	8350
	Nm	300	463	602	780	943

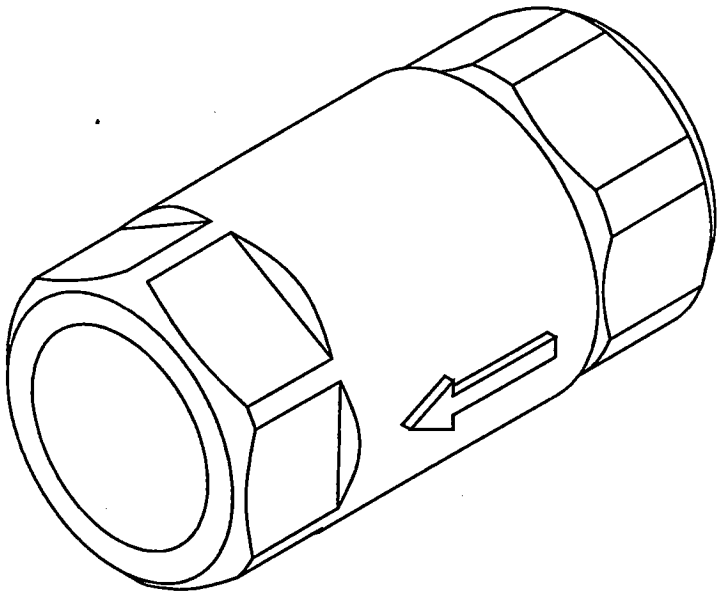
KAESER COMPRESSORS

Bronze Check Valve;

Threaded, 400 WOG, Cold, Non-Shock; 125 PSI Saturated Steam Spring Loaded Ball-Cone™ Check

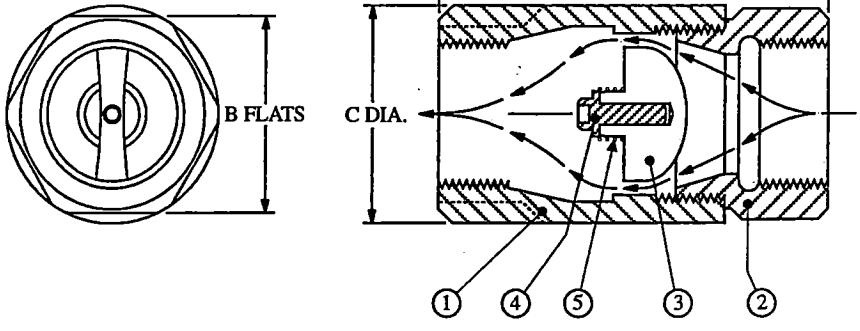
FEATURES

- Tight shutoff
- No radial alignment necessary
- Straight through streamlined for minimum change in velocity
- Vibration-free Ball-Cone™ check is spring-loaded for fast seating action



MATERIAL LIST

1.	Body	Bronze cast
2.	Tail Piece	
	(¼" – 1")	Bronze
	(1½ & 2")	Bronze cast
3.	Ball Check	Glass-filled TFE
4.	Guide	Brass
5.	Spring	316 Stainless Steel



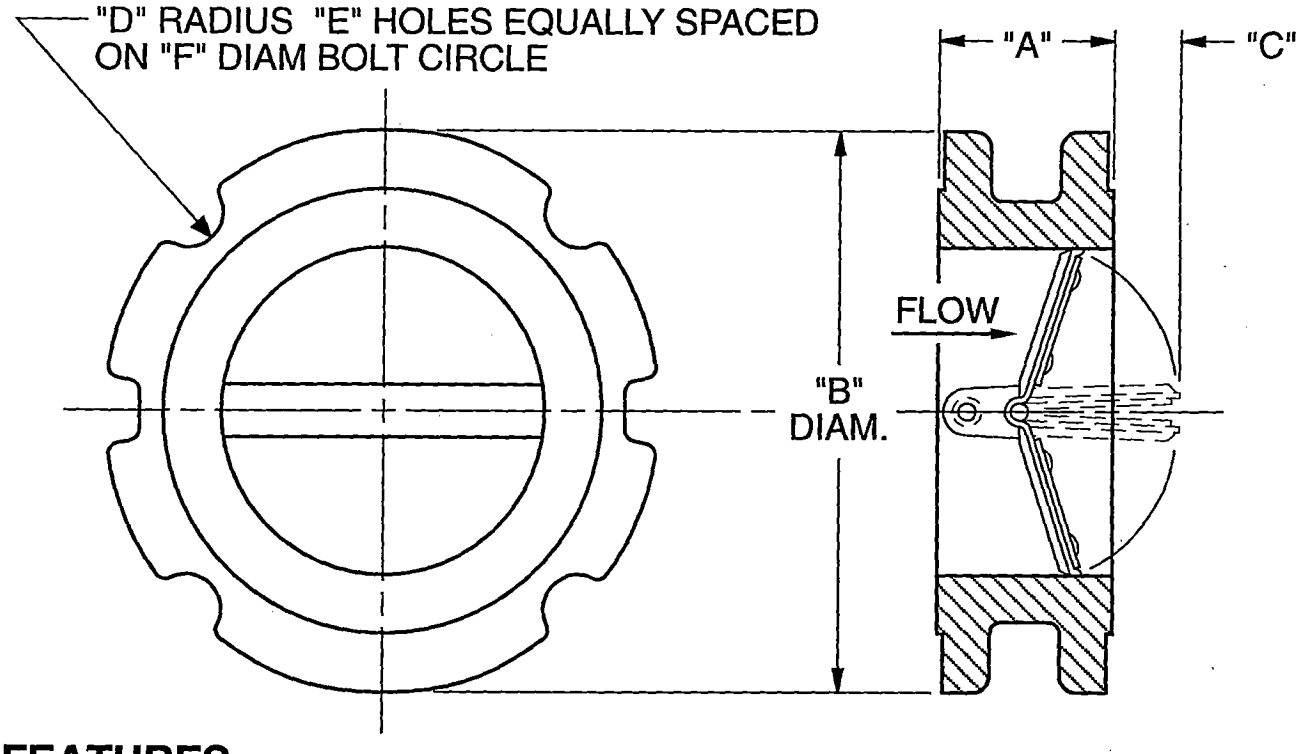
DIMENSIONS All dimensions in inches

PIPE SIZE	PART #	A	B	C	Cv*	Approx. Opening Pressure	Wt./100
¼"	A740-042-020	2-1/16	1-1/8	1-1/8	3	½ PSI	47
3/8"	A740-062-020	2-1/8	1-1/8	1-1/8	5	½ PSI	43
½"	A740-082-020	2-5/16	1-1/8	1-1/8	6	½ PSI	41
¾"	A740-102-020	2-7/8	1-3/8	1-½	12	½ PSI	84
1"	A740-122-020	3-½	1-¾	1-15/16	25	½ PSI	161
1½"	A740-162-020	4-15/16	2-½	2-13/16	65	½ PSI	442
2"	A740-182-020	6	3	3-11/16	120	½ PSI	760

* The Cv factor is the gallons of water per minute that the valve will pass with 1 PSI pressure drop with drop with valve fully open

KAESER COMPRESSORS

Wafer Check Valve;
125# Class



FEATURES

- Cast Iron Body with Aluminum Internals
- Silicone Sealing Components for Maximum Temperature Versatility
- 304 Stainless Steel Springs
- Standardized Maintenance Kit for Ease of Repair

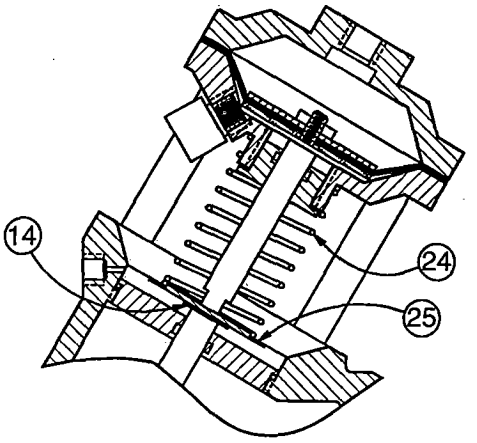
DIMENSIONS All dimensions in inches

PIPE SIZE	PART #	"A"	"B"	"C"	"D"	"E"	"F"	REPAIR KIT PART #
3"	A740-248-830	1-7/8	6	11/16	3/8	4	6	A740-248-831
4"	A740-328-830	2-3/8	7-1/2	7/8	3/8	8	7-1/2	A740-328-831
6"	A740-348-830	3-3/8	9-1/2	1-1/2	7/16	8	9-1/2	A740-348-831
8"	A740-368-830	4-3/8	11-3/4	2-1/4	7/16	8	11-3/4	A740-368-831
10"	A740-388-830	5-3/8	14-1/4	2-1/2	1/2	12	14-1/4	A740-388-831

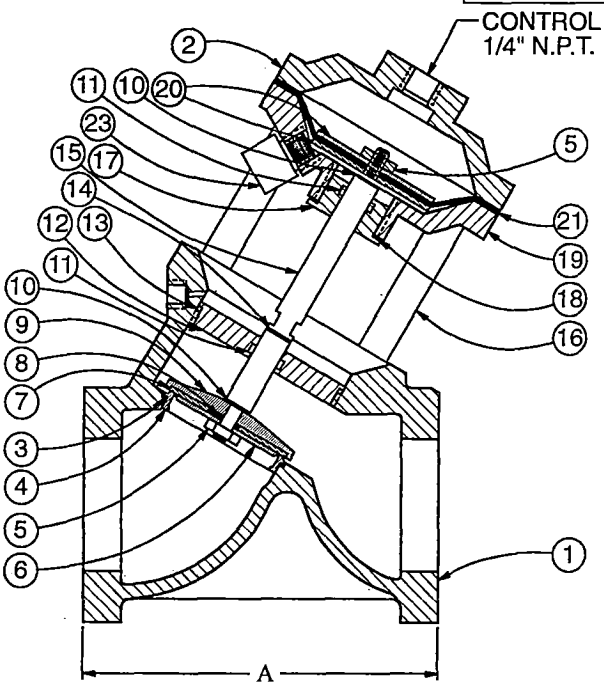
KAESER COMPRESSORS

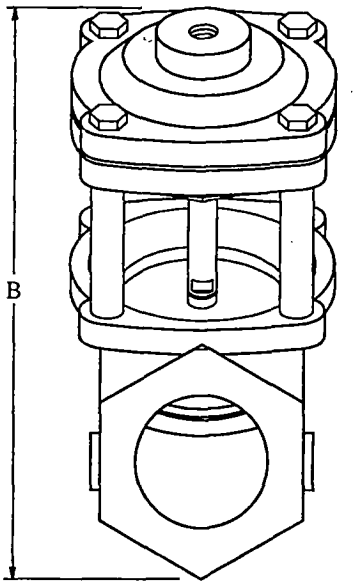
1½" ISOLATED BONNET DIAPHRAGM VALVE

SIZE	HECO NO.	"A"	"B"	UNITS
1½" NPT N.O.	A750-530-000	4.75"	5.37"	INCH
		120	136	mm
1½" NPT S.A.C.	A750-630-000	4.75"	7"	INCH
		120	136	mm



SPRING ASSIST CLOSE





NORMALLY OPEN

ITEM NO.	DESCRIPTION	QTY.
1	BODY	1
2	CAP	1
3	SEAT GASKET	1
4	SEAT	1
5*	LOCK NUT	1
6	DISC PLATE	2
7*	DISC	1
8	DISC SPACER	1
9	DISC HOLDER	2
10*	STATIC GASKET	1
11*	DYNAMIC "O" RING	1
12	"O" RING RETAINER	1
13	RETAINER GASKET	1
14	RETAINING RING	1
15	SHAFT	1

ITEM NO.	DESCRIPTION	QTY.
16	STAND OFFS	4
17	GUIDE BUSHING	1
18	STATIC GASKET	6
19	BOTTOM CAP	6
20	DIAPHRAGM PLATE	2
21*	DIAPHRAGM	1
22	HEX NUTS	8
23	ELBOW (1/8" M X 1/4¼" F)	1

SPRING ASSIST CLOSE

24*	SPRING	1
25*	CENTERING PLATE	1

* Parts included in Repair Kit (A750-930-170)

KAESER COMPRESSORS

4-WAY SOLENOID VALVE

¼" NPT - C_v UP TO 1.4

PRESSURE RANGE: 10 TO 150 PSI

(SEE OPERATING DATA)

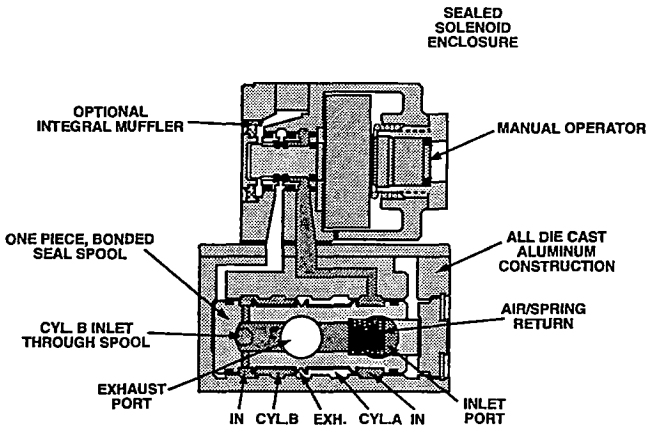
Single Coil: **A823-115-600**

Dual Coil: **A827-115-600**

FEATURES OF SOLENOID PILOT OPERATED VALVES

The solenoid versions feature:

- Air/spring return on single solenoid valves.
- Use for lube or non-lube service.
- Optional low wattage DC solenoids down to 1 watt.
- Various types of manual operators and electrical enclosures.
- NEMA 4 solenoid enclosure.



2-POSITION, SINGLE SOLENOID, INDIVIDUAL BODY

VALVE CONFIGURATIONS AVAILABLE

The solenoid pilot operated series is a small Inline 4-way valve with a C_v up to 1.4. This series provides fast response, long life and a high flow not commonly found in this size valve.

- 2-Position, single or double
- solenoid operator.
- Individual body or stacking body models.
- Manual and mechanical operators available.

SPECIAL APPLICATIONS:

On all models, energizing the "A" operator supplies pressure to cylinder port "A" and energizing the "B" operator supplies pressure to cylinder port "B"

For selector applications, additional piping considerations are required.

SELECTOR APPLICATIONS:

When using as a selector valve, connect the higher pressure to the Inlet port and the lower pressure to the Exhaust port.

On solenoid models, the inlet pressure must be a minimum of 25 PSI on singles or 10 PSI on doubles.

OPERATING DATA

PRESSURE RANGE

MAIN VALVE:		Pressures shown are minimum and maximum safe working pressures.
Single Solenoid, Spring Return	25 to 150 PSIG	
Double Solenoid	10 to 150 PSIG	

FLOW CONSTANT:

	INDIVIDUAL	STACKING
¼"	1.2	1.4

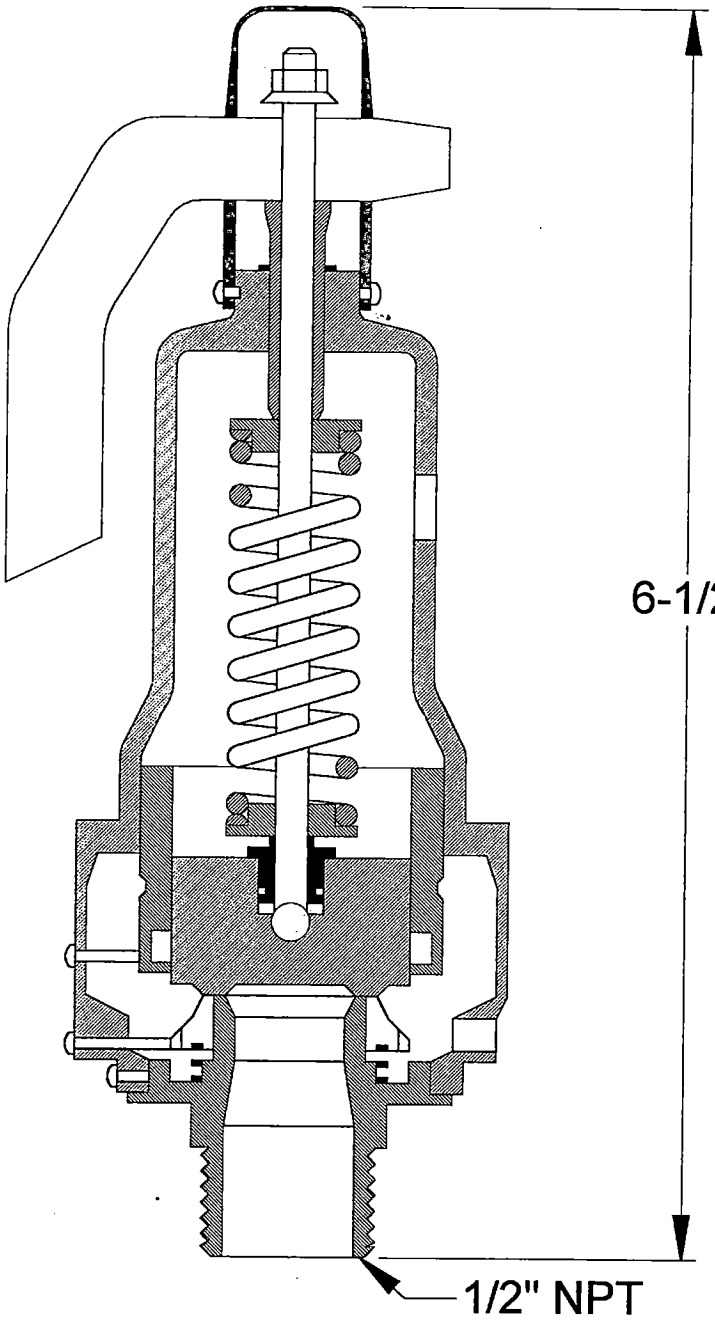
ELECTRICAL:

AC 120/60	Inrush	14.7 Volt-amps(.12 amps)
	Seal	10.4 Volt-amps(.09 amps)
DC 24 VOLTS		8.5, 6, 2.5 and 1 watt
ABOVE COILS		General Purpose Class "A", continuous duty, encapsulated.
LEADS:		#18 AWG X 18" Std.

FLUIDS: Air or inert gases

LUBRICATION: Not required, but if lubrication is used, a medium range aniline oil is recommended.

AMBIENT TEMPERATURE RANGE: 0º to 120ºF (-18º to 50ºC.)



ASME CODE (UV) NATIONAL BOARD CERTIFIED
SET PRESSURE AT 150# STD.
MAXIMUM FLOW RATE: 350 SCFM

KAESER COMPRESSORS

KAESER AIR COMPRESSORS

SAFETY PRESSURE RELIEF VALVE

½" NPT

PART#: 840-311-590