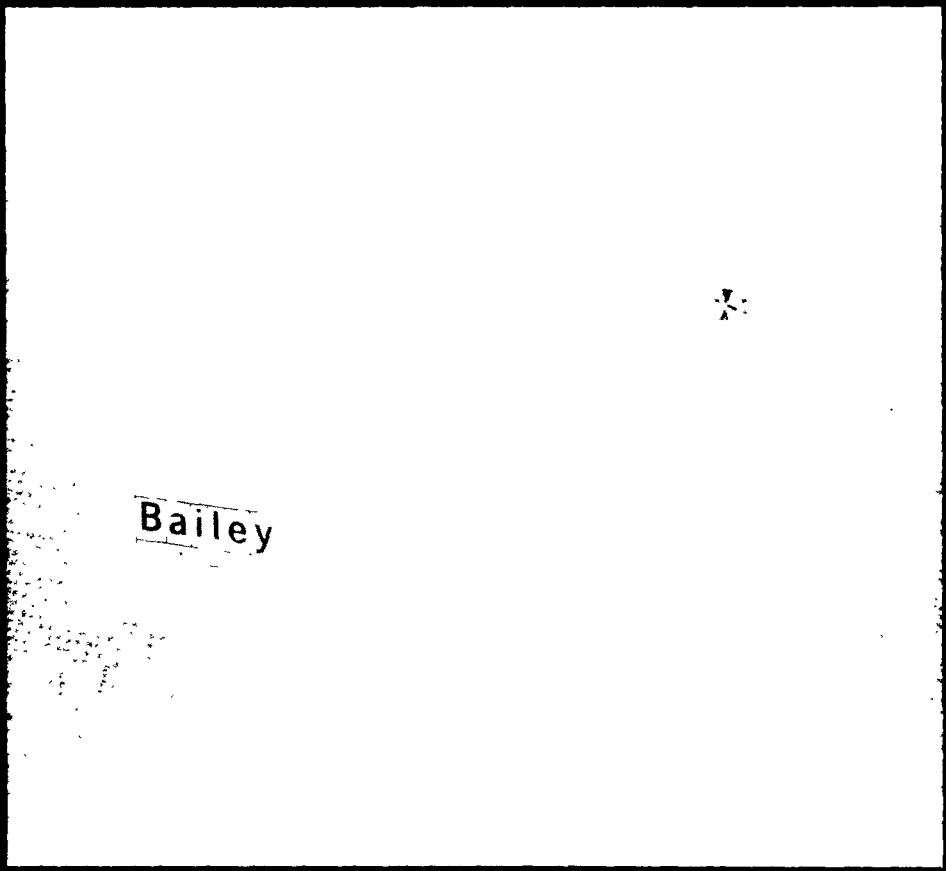
MINI-LINE 520* Computer/Controller

Type FC



Instruction Book Price $5.00

*Reg U S Pat Office

Form IP92 11A Litho in U S A 5/78

Babcock & Wilcox
Bailey Meter Company, U S A

WARNING

INSTRUCTION MANUALS

DO NOT NSTALL, MAINTAIN OR OPERATE TH S EQU PMENT W THOUT READ NG UNDERSTAND NG AND FOLLOWING PROPER Babcock & Wilcox Bailey Meter Co. U.S A INSTRUCT ONS AND MANUALS OTHERW SE INJURY OR DAMAGE MAY RESULT

ATTENTION

MANUELS D OPERAT ON

NE PAS METTRE EN PLACE RÉPARER OU FA RE FONCT ONNER CE MATÉR EL SANS AVOIR LU, COM PRIS ET SUIV LES INSTRUCTIONS RÈGLEMENTA RES DE Babcock & W lcox Bailey Meter Company, U.S.A TOUTE NÉGLIGENCE À CET ÉGARD POURRA T ÊTRE UNE CAUSE D'ACCIDENT OU DE DÉFAILLANCE DU MA TÉRIEL

TABLE OF CONTENTS

INSTALLATION

WARNING THIS UNIT SHOULD NOT BE IN-STALLED IN AN ENVIRONMENT CONTAIN ING CHLORINATED OR AROMATIC HYDRO CARBONS THESE ELEMENTS WILL DAM AGE THE POLYCARBONATE COVER THE COVER WILL ALSO BE DAMAGED BY AMINOS, ALKALIES AND AMMONIA

AVERTISSEMENT CET ENSEMBLE NE DOIT PAS ETRE INSTALLE DANS UN ENVIRONNE MENT CONTENANT DES HYDROCARBURES AROMATIQUES OU CHLORES CES ELE MENTS ENDOMMAGERAIENT LE COUVER CLE EN POLYCARBONATE L'AMMONIAQUE. L'ALCALI ET LES AMINES ENDOMMAGENT EGALEMENT LE COUVERCLE

Unpacking and Storage

1 Check for any obvious damage to ship ping carton or contents Report any damage to carrier

2 Make certain that unit is correct range for intended service (refer to identification label)

3 If unit is to be stored, repack in original container and store in an area free of corrosive vapors and extremes in temperature and humid-ity Storage temperatures should fall within limits of 20° F and +160° F (29°C and +72°C)

Mounting and External Connections

The Controller is designed for wall or sur face mounting and should be mounted as fol-lows

1 Attach controller to wall, panel or relay rack as shown in Figure 1 and secure with three 1/4 inch cap screws, nuts and lockwashers

NOTE Mounting in any other position will re quire recalibration of the unit

2 Make necessary adjustments for particular service as outlined under "Placing In Service"

3 Make external connections to mounting base (Figures 1 and 2) Connections are 1/8" 27 NPT female

4 Adjust air supply to mounting base to 18 to 20 psig (124 to 138 kPa) See "Quality Standard for Instrument Air", 1975, ISA S7 3 at the end of this section

NOTE If tubing elbows are desired, the following fittings are recommended

E2 and Output 1/8 NPT male to tubing elbow

E_1, E_3, E3R and S - 1/8 NPT x 1" nipples and 1/8 NPT female to tubing elbows

To facilitate assembly, install the E_2 and Output tubing elbows first

Quality Standard for Instrument A r, 1975, ISA-S7 3

4 1 1 Outdoor nsta at ons (where any part of the nstrument a r system s exposed to the outdoor atmosphere)

The dew po nt at ne pressure sha be at east 10°C (18°F) be ow the m n mum oca recorded amb ent temperature at the p ant s te

4 1 2 ndoor nsta at ons Where the ent re nstrument a r system s instal ed indoors)

The dew po nt at ne pressure sha be at east 10°C (18°F) be ow the m n mum temperature to wh ch any part of the nstrument air system is exposed at any season of the year n no case should the dew po nt at ne pressure exceed 2°C (approx mate y 35°F)

4 2 Part c e S ze

The max mum part c e s ze n the a r stream at the nstrument sha be three(3) m crometres

4 3 Oil Content

The max mum tota o or hydrocarbon content exc us ve of noncondensab es sha be as c ose to zero(0) w/w or v/v as poss b e and under no c rcumstances sha t exceed one(1) ppm w/w or v/v under norma operat ng cond t ons

4 4 Contam nants

The nstrument a r sha be free of a corros ve contam nants and hazardous gases, f ammab e or tox c, wh ch may be drawn nto the nstrument a r stream f contam nat on ex sts n the com pressor intake area, the a r should be taken from an elevat on or remote oca on free from contam nat on or processed to remove such contam nat on Any cross connect ons or process connect ons to the nstrument a r p p ng sha be so ated to prec ude contam nat on of the a r system A regu ar per od c check shou d be made to assure h gh qual ty nstrument a r

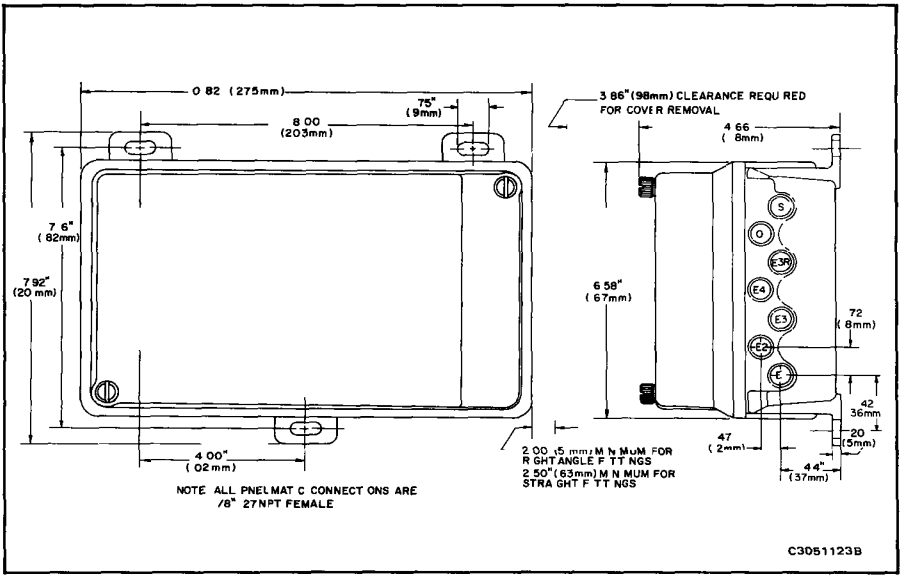
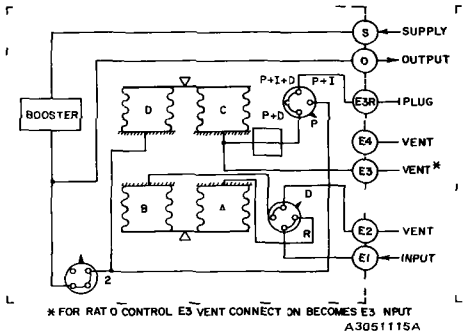
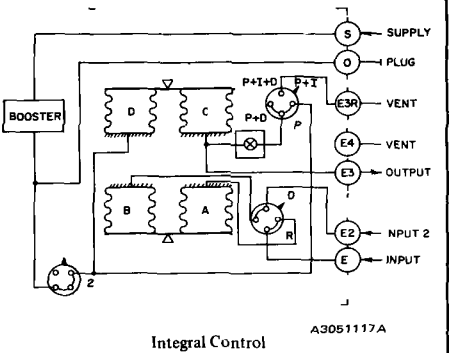


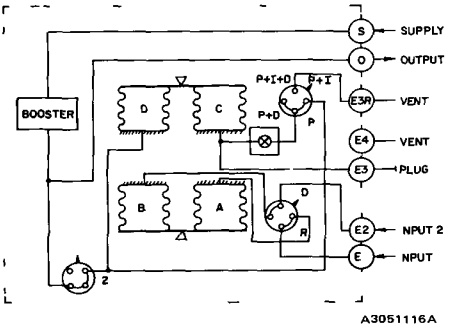
FIGURE 1 External and Mounting Dimensions, Pneumatic Computer/Controller, Type FC.



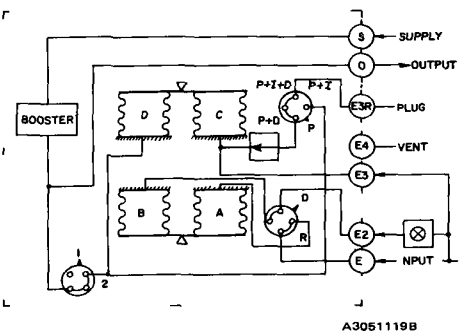
Proportional (Multiplication, Division, Ratioing)



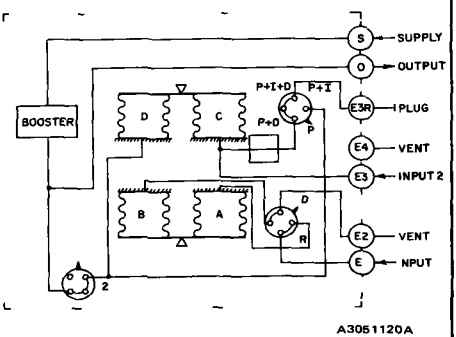
Integral Control



Proportional Plus Integral Contro'



Proportional Plus Derivative (External) Control



Totalizing (Addition)

FIGURE 2 Tubing Connections and Switch Settings for Type FC Controller

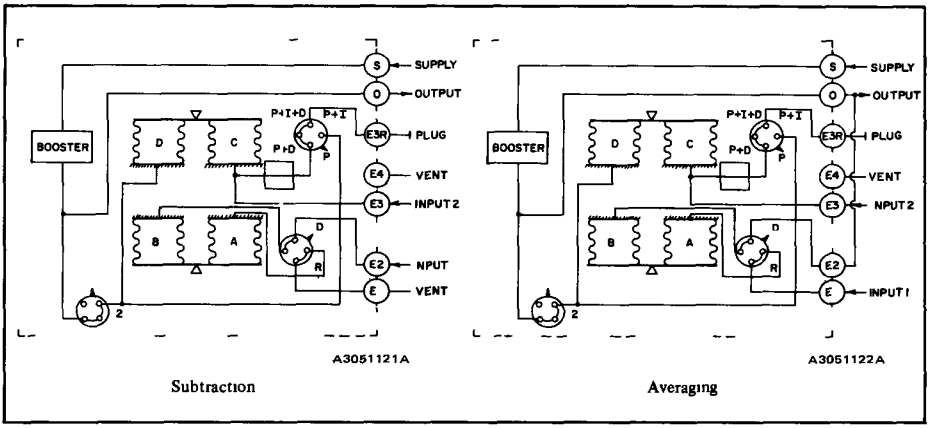


FIGURE 2 Tubing Connections and Switch Settings for Type FC Controller, continued

PLACING IN SERVICE

The controller is factory calibrated for use in a differential plus summing application

IMPORTANT If this factory calibration has been changed (e g , thru bellows rotation or turning of the null screw) the controller must be renulled as outlined under "Comp ete Calibration" If the factory calibrated application is desired, the controller may be placed directly in service after making the required connections and checking the calibration (Figure 1 and Figure 2)

NOTE The controller is nulled when the proper bias spring and nulling screw adjustments are made, and the required "null pressure" is applied to bring the bellows beam parallel to the base At null balance, the gain mechanism can be shifted through full range without causing a significant change in output pressure, since no change in vane nozzle distance occurs over full travel of the gain mechanism

To adjust the unit for any other service, follow the procedure outlined below

Adjusting for Service (Null Calibration Procedure)

1 Check alignment Adjust A/B and C/D bias to align linkage pivot pin to be directly over (as viewed from the top) of protrusion mark located on range (gain) adjust arm

IMPORTANT Large adjustment must be made by coarse adjustment nuts located on each side of leaf spring bias adjustment These leaf springs should be essentially parallel to controller case base (approximately 1/8" out from the stop) after all bias adjustments have been completed

2 Set switch positions to the following D/R to "D" as required for service, P/P + I function switch to "P", #1/#2 bypass switch to position #1 (Refer to Figure 3 for switch positions and other controller adjustments)

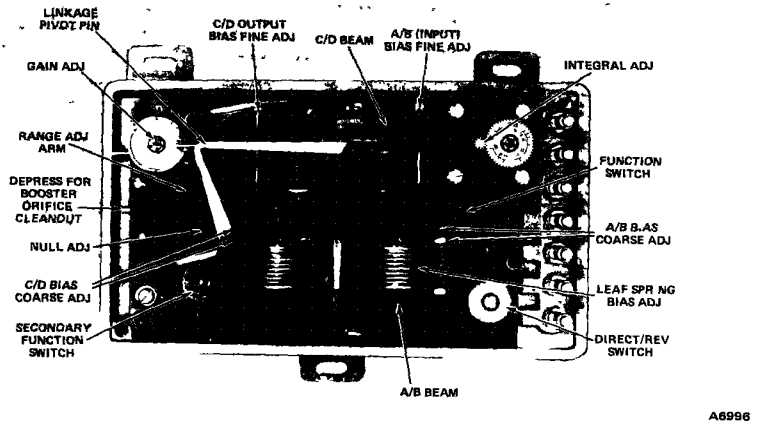


FIGURE 3 Controller Adjustments

3 Connect null input pressure(s) to input connection(s) as required for service

4 Connect pressure gage or manometer to output connection "0" and apply 18 to 20 psi (124 to 128 kPa) to supply connection "S"

5 Set gain at 1 and adjust C/D bias screw to obtain required output null pressure

6 Set gain at 10 and adjust A/B bias screw to obtain required output null pressure

7 Repeat steps 5 and 6 until output is within +2 psi (14 kPa) of required null pressure at a gain of 1 to 10

8a Move gain from 1 to 10 and note any change in output between these settings At point of greatest deviation, adjust error three times the error, in direction of error, using null adjustment screw on gain arm

8b Set gain to 1 and readjust C/D bias screw to required pressure

8c. Set gain to 10 and readjust A/B bias screw to required pressure

9 Repeat step 8 above until gain can be changed from 1 to 10 without changing output less than + 1 2 psi (8 kPa) at any gain setting

Nulling operation is now complete

10 Set gain to desired value and check output values for given minimum and maximum input values

NOTE Gain markings on scale are only approximate

11 Set P/P+I function switch and secondary function switch (Position #1 or #2) for desired service

12 Set integral and external derivative control action units, if required, to desired speed of response by rotating adjustment screw

NOTE If controller cannot be adjusted with above procedure or if controller has been disassembled or factory calibration has been disturbed, complete calibration is required as outlined under "Complete Calibration"

ROUTINE MAINTENANCE

1 Air supply to Controller must be kept free of dirt, oil and moisture for satisfactory operation Inspect felt filters in Controller mounting base and replace them if they are dirty Frequency of filter replacement will depend on the quality of the supply air See "Quality Standard for Instrument Air", ISA S7 3, 1975 under "Installation"

NOTE These filters are included as added protection only and are not intended to take place of required clean air supply

2 When necessary, replace felt pad air filters in E1, E2, E3R and S connections (Figure 4) as follows

a Turn off supply air and disconnect supply air and output lines noted in (2) above

b Remove fittings

c Remove wire mesh discs and felt pads with pick or similar instrument

d Replace felt pads and wire mesh discs

e Replace fittings

f Reconnect supply air and output lines to mounting base

3 All pressure connections must be kept air tight Check all air pressure connections for leakage with suitable leak detector solution

4 Inspect Controller nozzle tip (Figure 7) and vane for deposits of oil, dirt, etc Clean with a suitable solvent

5 Clean booster, using orifice cleanout plunger WHEN EQUIPMENT IS NOT OPERATING

WARNING USE OF THE BOOSTER CLEANOUT DEVICES WHEN EQUIPMENT IS OPERATING ON LINE CAUSES PNEUMATIC SIGNAL "BUMP" WHICH COULD CAUSE SERIOUS SYSTEM UPSET

AVERTISSEMENT L'EMPLOI DU DISPOSITIF DE NETTOYAGE DU SURPRESSEUR PENDANT QUE L'EQUIPEMENT EST EN FONCTIONNEMENT DIRECT PROVOQUE UN "CONGNEMENT" DU SIGNAL PNEUMATIQUE ET RISQUE DE CAUSER UN DERE GLAGE SERIEUX DU SYSTEM

a To clean booster orifice push cleanout plunger (Figure 3)

b Check output bleed orifice located just below orifice cleanout plunger for normal small air bleed

c If necessary clean out any obstructions by manipulating cleanout wire

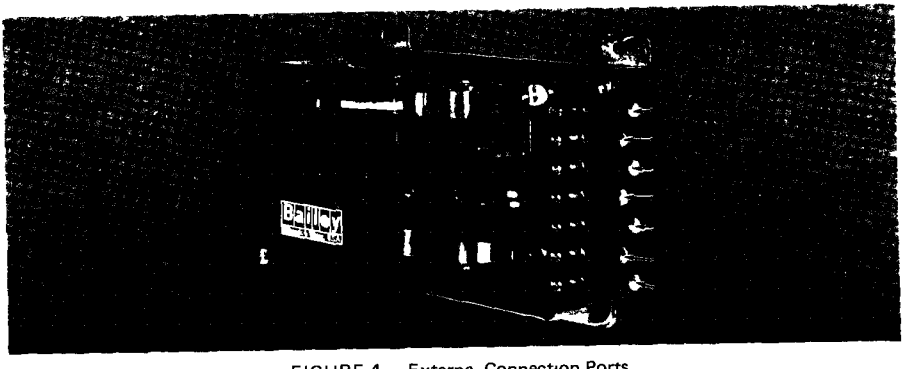


FIGURE 4 Externa Connection Ports

COMPLETE CALIBRATION

If the Controller has been disassembled for any reason, or factory calibration has been dis turbed, or the controller cannot be correctly adjusted as outlined under "Placing In Service", the Controller must be completely recalibrated as outlined below under "Basic Alignment"

No calibration of the booster is required

NOTE For maximum accuracy, the Controller should be calibrated in the same position as that of final installation

Also, it is suggested that an extra controller mounting assembly (part no 5327136 1) be used when calibrating in order to eliminate disruption of piping

Basic Alignment (Parts Drawing P92-11 1)

1 With controller removed from mounting base, check and/or adjust the following

a. A/B or C/D Beams should be parallel and hinge (33) straight

b Linkage pivot pin (42) should be in center of range adjustment shaft (50)

c Nozzle should be in center of vane pad

d Vane pad link should contact pivot pin (42)

e Spring bias adjustment (leaf springs) (20) should be parallel to base, and nuts (65) should be tight

2 Place controller switches in the following positions

a Direct/reverse sw tch in "D" position

b P/P+I function switch in "P" position

c Bypass switch with indicator pointing up towards C/D beam (Position #1)

3 Install controller into mounting base and turn on supply pressure, 18 to 20 psig (124 to 138 kPa)

4 Leak test as follcws

a Position range adjust (50) all the way to left

b Apply 15 psi (103 kPa) to E1, E2, E3 and E3R connections and adjust CD (output) bias screw (6) to get 15 psi on output (When function switch is in P+I position, E3R port must be plugged) This applies 15 psi to all bellows (A,B, C and D)

c Check all O rings and gaskets for leaks Make sure that integral cover gasket (27) (Type FC210) does not leak

5 Controller is now ready to be adjusted in accordance with procedure under "Placing in Service"

TROUBLESHOOTING

If the controller is inoperative or if operation is faulty, check the calibration as outlined under "Placing in Service" and perform operations listed under "Routine Maintenance" If operation is still faulty perform a visual check for loose screws, damaged or broken parts, leaks etc The Fault Correction Chart lists most common problems and corrective actions

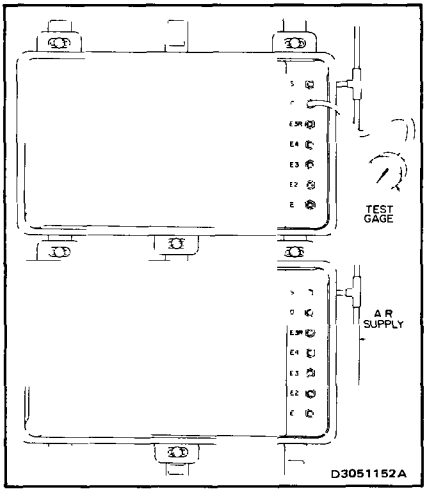


FIGURE 5 Type FC Controller mounting and test gage attachment

Test Gage Kit (Figure 5)

A test gage (part no 5328485 1) is available as an accessory to aid in troubleshooting the pneumatic control system The kit consists of a gage, tubing and a test probe, and uses the pneumatic test jacks on the controller mounting cover Slowly attach the test gage probe and read pressure After reading, remove probe and replace jack cap and controller cover

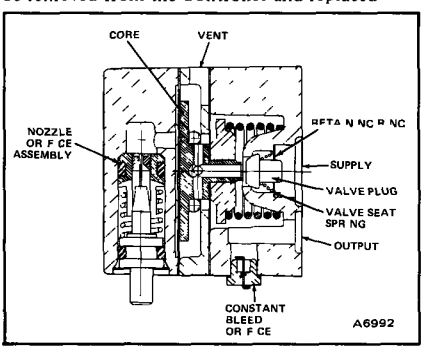
WARNING TEST GAGE SHOULD NORMALLY BE USED ONLY TO TROUBLESHOOT A FAULTY SYSTEM THAT IS NOT IN AN OPERATING MODE PROBE INSERTION CAUSES A PNEUMATIC SIGNAL "BUMP" WHICH COULD CAUSE SERIOUS SYSTEM UPSET

AVERTISSEMENT IL NE FAUT UTILISER LA JAUGE D'ESSAI QUE POUR DETECTER UNE PANNE SUR UN CIRCUIT DEFECTUEUX QUI N'EST PAS EN COURS DE FONCTIONNEMENT L'INSERTION DE LA SONDE PROVOQUE UN "COGNEMENT" DU SIGNAL PNEUMATIQUE QUI RISQUE DE CAUSER UN DEREGLAGE SERIEUX DU SYSTEME

Pneumatic Booster (Figure 6)

No calibration or adjustment of the booster is required

In normal operation the booster is inaudible However, if the core and the valve plug seat of the output section are not aligned or the valve plug is not seated properly, the booster will produce a hissing sound If this occurs the booster should be removed from the Controller and replaced



F GURE 6 Pneumat c Booster

FAULT CORRECTION CHART

Fault	Cause	Correction
Contro er noperab e	a No a r supp y b Booster or f ce c ogged c Vane not touch ng nozz e d D rty a r supp y e Incorrect sw tch pos t on f Worn base grommet (mount ng base a r va ves c osed)	a Check supp y connect on b Press or fice c eanout p unger (See Note 1) c Adjust C/D b as d Check operat on of booster e See F gure 2 and correct f Rep ace grommet
Control er unstab e	a Fasteners loose b Insuff c ent pre oad on nkage p vot p n	a T ghten fasteners b S ght y be d center of vane nk
Bel ows cannot be ba anced	a Beam h nge bent b Damaged be ows	a Replace h nge b Rep ace be ows
Contro er output goes to zero	a Booste or f ce c ogged	a Press or f ce c eanout p unger (See Note 1)
Controller output goes to supply pressure	a Blocked passages from booster un t to nozz e	a C ean and b ow out passages
Poor accuracy	a Be ows not ba anced b Vane pad not centered at n u pressures	a Ba ance be ows Refer to 'Ca brat on" b Center vane pad
Poor sens t v ty	a Vane pad not perpend cu ar to nozz e b Booster b eed or f ce c ogged c Vane pad not centered at null pressures d Leakage n nput nes or test jacks	a Repos t on nkage b C ear by ma n pu at ng or f ce w re c Center vane pad d Check w th eak detector and repa r
S ow response	a Restr ctors under D/R sw tch c ogged	a C ean D/R sw tch
H gh hysteres s	a Loose fasteners nc ud ng be ows set screws	a T ghten be ows set screw
Ga n changes (h gh v brat on)	a Range (ga n) adjust shaft nsuff c ent y torqued	a Retorque (See Note 2)
Set po nt changes w th ntegra adjustment	a Leak at ntegra va ve, E3 connect on or C be ows	a Check and repa r
Integra t me not equa n both d rect ons	a Leak beyond ntegra va ve (C be ows) or E3 connect on	a Check and repa r
Der vat ve t me not equa n both d rect ons	a Leak at der vat ve va ve or D be ows	a Check and repa r passage or be ows
Booster output pressure does not mmed ate y ncrease when nozz e back pressure s ncreased	a C ogged or f ce b Leakage around sect ons of cast ng c D rty f ters n mount ng base	a Press or f ce cleanout p unger (See Note 1) b Remove booster and retorque screws c Remove and rep ace f ters
Booster output pressure does not mmed ate y decrease when nozz e back pressure s reduced	a B ocked a r passages from booster un t to nozz e b nterna eakage of booster	a C ean a r passages b Rep ace booster

Notes 1 Press or f ce c eanout p unger on y when equ pment s not operat ng See WARN NG under "Rout ne Ma ntenance"
2 Overtorqu ng w ncrease nu hysteres s

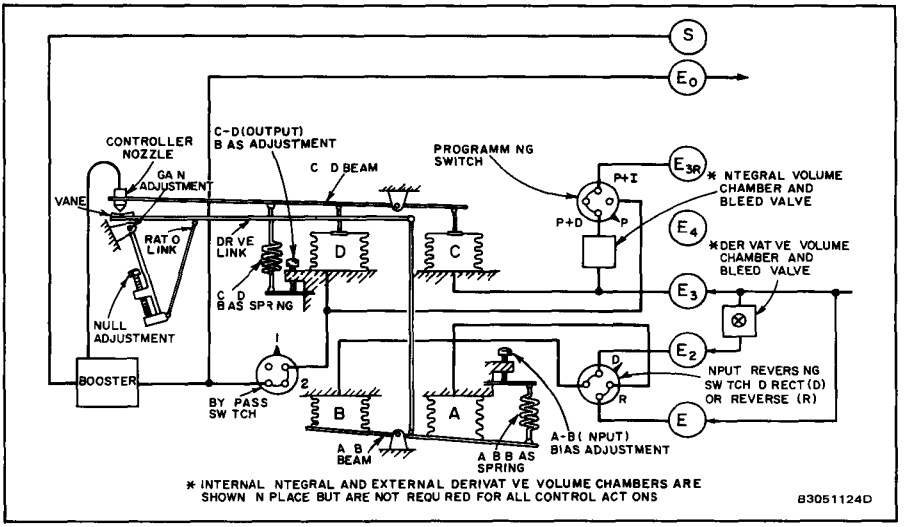


FIGURE 7 Schematic Diagram of Pneumat c Computer/Contro er, Type FC

OPERATION

The Computer/Controller is shown schemat ically in Figure 7

The computing section consists of four bel lows designated A,B,C and D, A B and C D beams, bias springs and their adjustments, vane positioning linkage and its adjustments, gain adjustment, programming switches and, when required, internal integral and external deriva tive volume chambers

The transmitting section consists of the vane and nozzle and the low gain closed loop booster

The controller A B beam moves in proportion to the difference in pressure between the A and B bellows and according to any forces applied by the A B bias spring A B beam motion is coupled to a vane through an adjustable four bar linkage This linkage allows vane motion toward or away from the controller nozzle, which is attached to the C D beam, providing adjustable gain A change in nozzle vane relationship results in increasing or decreasing nozzle back pressure to the booster which then transmits a corresponding amplified output signal This output is fed back to the D bellows as a 3 15 psi (20 7 to 103 kPa) signal which repositions the C-D beam restoring normal nozzle vane relationship

NOMENCLATURE

Digit 1 2 3	Description
FC 1 2 1 0	Pneumatic Computer/Controller Proportional Only Proportional plus Integral 3 to 15 psig (20.7 to 103 kPa)

SPECIFICATIONS

Accuracy†	Factory calibrated (as different a proportional controller)* to be accurate within ±0.5% of span at Gain 1
Input/Output Signal Range	3-15 psig (20.7 to 103 kPa)
External Connections	1/8 inch 27 NPT female
Operating Conditions	Normal Ambient Temperature 40° to 140°F (4.4° to 60°C) Extreme 20° to 160°F 29° to 71°C)
Repeatability	0.2% at Gain 1
Deadband	0.05% of output span
Temperature Effect	±2% of output span over 100°F (55°C) span with gains 0.2 to 5.0
Air Supply	*8.20 psig (*24 to 138 kPa) for 3-15 psig (20.7 to 103 kPa) signal range recommended 25 psig (172 kPa) maximum
Steady State Air Consumption	0.07 scfm (.330 x 10^{-4} m^3/S)
Supply Pressure Effect	0.25%/psi
Supply Capacity (one psi drop in output)	1.0 scfm (4.72 x 10^{-4} m^3/S)
Exhaust Capacity (one psi increase in output)	1.0 scfm (7.55 x 10^{-4} m^3/S)
Position Sensitivity (30° any direction)	+1% of input span
Vibration Effect	Tested in accordance with M.L.STD 167B
Independent Linearity	+0.25%
Weight	Net 8.3 lbs (3.77 kg) *Shipping 11 lbs (4.99 kg)*
Gain Range	.2 to 20
Integral Range	.05 to 100 repeats per minute
Derivative Range	1 to 10 minutes

†As defined by SAMA Standard PMC20.1

*Minor field adjustment may be required when used for other functions

NOTE
Above data at mid-range reference conditions
Temperature 75°F (24°C) ±5°F (±3°C)
Supply Pressure 18-20 psi (124 to 138 kPa)
Gain 1 (where applicable)

REPLACEMENT PARTS

Ordering Individual Parts

The following drawings are Parts Drawings for the Type FC Pneumatic Computer/Controller and its spare parts kits Items with part numbers *may be ordered separately Items with kit numbers* (without separate part numbers) must be ordered by the kit number in which they are included

These drawings will normally apply to the units furnished However, there may be individual differences in specific units because of

a design changes made since the printing *of this instruction, or*

b special design of equipment furnished to make it suitable for a special application

Therefore, when ordering individual parts or kits, assure the receipt of correct replacements by specifying on the order

a *complete nomenclature and series number* of equipment for which parts are desired and

b the Parts Drawing number and title on which each part is illustrated (e g , Parts Drawing P92 11 1, Controller Assembly, Part No 5327000 □)

Recommended Spare Parts

The following listed spare parts kits should be stocked in the quantities listed

KIT NO	NAME	QUANTITY
258141 1	BOOSTER	1
258142 1	A B BELLOWS	1
258143 1	C D BELLOWS	1
258146 1	FILTER	1
258147 1	COVER	1
258148 1	O RING REPLACEMENT	1

Accessories

The following accessories are recommended

PART NO	NAME	QUANTITY	COMMENTS
5327136 1	CONTROLLER MOUNT	1	PLUG IN MOUNT TO BE USED FOR CALIBRATING CONTROLLER BASE ASSEMBLIES
5328485 1	TEST PROBE	1	ASSEMBLY (GAGE TUBING TEST CONNECTOR) FOR CONTROL SIGNAL MONITORING, AND ADJUSTMENT, CALIBRATION AND PERFORMANCE CHECKS
5324066 1	VALVE CORE	1	EXTRA A R TRAPPING VALVE FOR OUTPUT CONNECTION

Options

Integral Function

If the controller was initially ordered without the integral function (FC110), it can be converted to a proportional + integral controller (FC210) by installing a plug in unit and hardware

PART NO	NAME	QUANTITY
5327790 1	INTEGRAL VALVE ASSEMBLY	1
5326959 1	VOLUME CHAMBER SEAL	1
190 32x 75 STN STL	MACHINE SCREWS	4
190 STN STL	REGULAR SPRING LOCKWASHER	4

To install the integral unit, remove sealing screw (Parts Drawing P92 11 1, Item 16) from the bottom of the controller cast in volume chamber Lubricate the volume chamber seal and o ring on the integral valve assembly and install, securing with screws and lockwashers Controller must then be renulled for integral application

Derivative Function

Add external derivative unit to the controller mounting base (Figure 2)

PART NO	NAME	QUANTITY
5316733 1	RATE ASSEMBLY	1

Bailey Meter Company, Wickliffe Ohio 44092, a subsidiary of Babcock & Wilcox, U S A

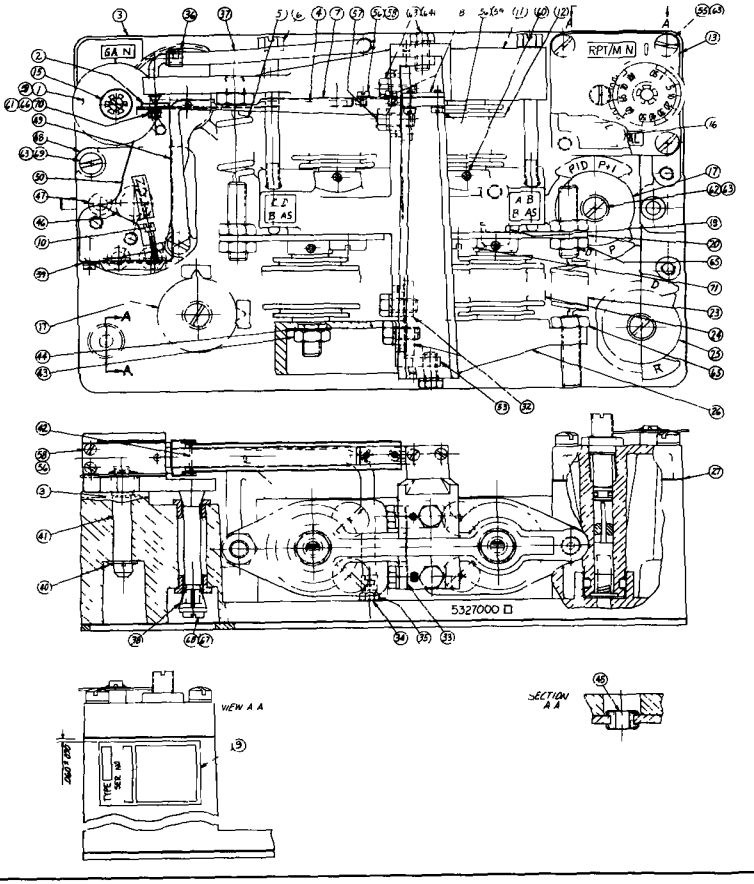
Bailey Meter Australia Pty Ltd , Regents Park, N S W , Australia
Bailey do Brasil Sao Paulo, Brazil
Bailey Meter GMBH, Mannheim, West Germany

Bailey Meter Company Ltd , Pointe Claire Quebec Canada
Bailey Japan Company, td , Nirayama-cho, Japan
Representatives in Other Principal Cities

Bailey Control Systems

Parts Drawing
P92-11-1

CONTROLLER ASSEMBLY
PART NO. 5327000-□



SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

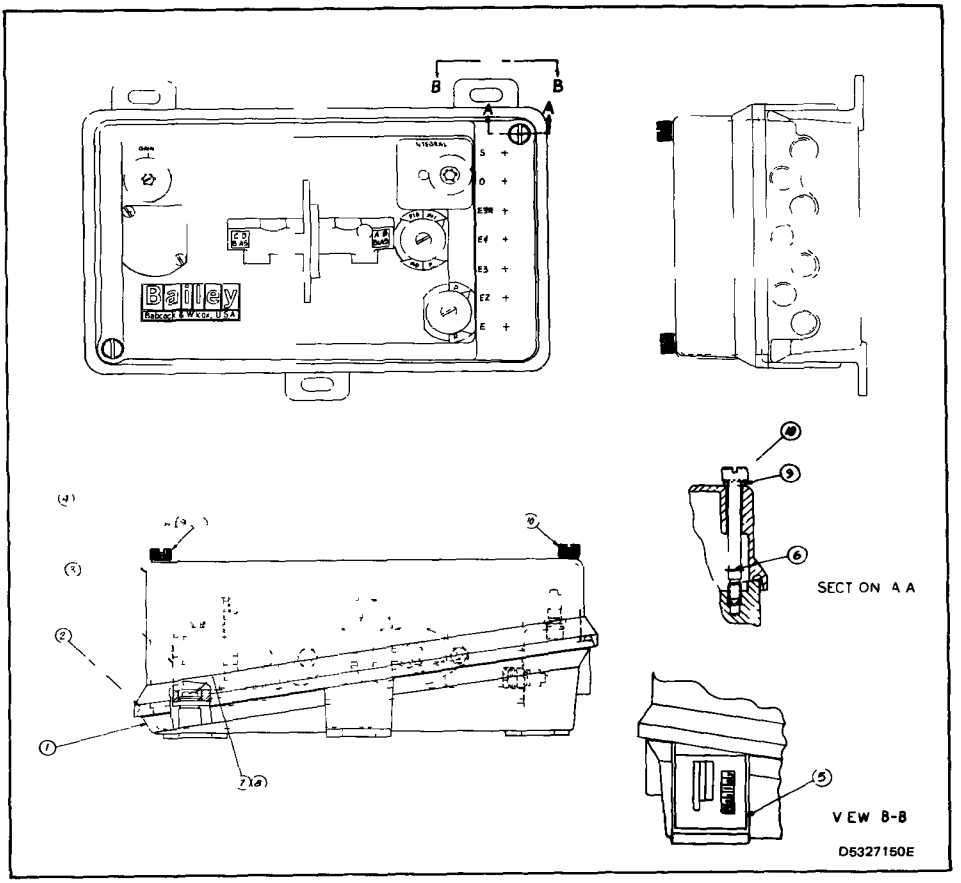
Parts Drawing P92-11-1 Controller Assembly

ITEM	PART NO	NAME
1	5327774 1	SCALE MOUNT NG PLATE SEE TABLE
2	K T NO 258144 1	ADJUSTABLE VANE END
3	SEE TABLE	CONTROLLER BASE ASSEMBLY
4	5327058 1	VANE BODY
5	SEE TABLE	C D B AS SPR NG ASSEMBLY
6	5326981 1	B AS ADJUSTMENT SCREW 2 REQD
7	5326980 1	DR VE L NK
8	5327055 1	H NGE CLAMP 2 REQD
9	1962928 *	SERV CE LEGEND
10	5326974 1	NULL ADJUST MENT SCREW
11	5326975 1	C D BEAM ASSY
12	K T NO 258143 1	C D BELLOWS ASSEMBLY, 2 REQD
13	5327790 1	NTEGRAL VALVE ASSEMBLY, SEE TABLE
15	197480 18	RETA N NG R NG SEE TABLE
16	452219-3	SEAL NG SCREW, SEE TABLE
17	5320657 1	ON OFF SW TCH ASSY 2 REQD
19	K T NO 258148 1	O R NG 4 REQD
20	5326956 *	SPR NG B AS ADJUSTMENT, 2 REQD
23	5326957 1	A B B AS SPR NG ASSEMBLY
24	K T NO 258142 1	A B BELLOWS ASSY 2 REQD
25	5320658 1	D RECT REVERSE SW TCH ASSY
26	5326976 1	A B BEAM
27	5326959 1	VOLUME CHAMBER SEAL, SEE TABLE
31	19734 18	WASHER, SEE TABLE
32	5326970 1	CLAMP PLATE, 4 REQD
33	5326969 1	SPR NG H NGE
34	26126 1	SEAL WASHER
35	26002 1	TUBE F TT NG
36	1951049 3	COMPRESS ON CL P 2 REQD
37	1951567 1	NOZZLE TUB NG
38	5316156 1	RANGE ADJUST MENT SHAFT CLAMP
39	5327771 1	RAT O L NK SUPPORT
40	197480 25	RETA N NG R NG, SEE TABLE
41	5326995 1	P N ON SEE TABLE
42	5315891 1	P N
43	K T NO 258142 1 AND K T NO 258143 1	TH N NUT, 4 REQD
44	K T NO 258142 1 AND K T NO 258143 1	SPR NG WASHER 4 REQD
45	67125 10	GROMMET
46	K T NO 258141 1	O R NG
47	K T NO 258141 1	O R NG 3 REQD
48	K T NO 258141 1	PNEUMAT C BOOSTER
49	5326986 1	RAT O L NK
50	5326992 1	RANGE ADJUSTMENT
51	5327064 2	ADJUSTMENT SCALE SEE TABLE
53	5327114 1	CLAMP PLATE 2 REQD
55		190-32x 750 LG F L HD STN STL MACH SCR, SEE TABLE
56		086 STN STL REG SPRG LKWSHR 6 REQD
57		190-32x 500 LG HEX HD STN STL SEMS EXT 4 REQD
58		086 56x 125 LG PAN HD STN STL MACH SCR, 4 REQD
59		086 56x 250 LG PAN HD STN STL MACH SCR, 2 REQD
60	K T NO 258142 1 AND K T NO 258143 1	112-40x 188 LG HEX SOC HDLS STN STL CONE PT SET SCR, 4 REQD
61	K T NO 258144 1	086 BRASS FLAT WASHER
62		190 32x 375 LG F L HD STN STL MACH SCR 3 REQD
63		190 STN STL REG SPRG LKWSHR SEE TABLE
64		190 32x 375 LG HEX HD STN STL CAP SCR, 8 REQD
65		250 28 STN STL REG HEX JAM NUT 6 REQD
66	K T NO 258144 1	1202-00 STN STL SHKPRF LKWSHR
67		138 32x 312 LG PAN HD STN STL MACH SCR
68		138 STN STL TYPE A PLA N N WASHER
69		190 32x1 375 LG FIL HD STN STL MACH SCR, 2 REQD
70	K T NO 258144 1	086 56 BRASS HEX NUT
71		250 20x 500 LG PAN HD STN STL MACH SCR, 4 REQD

NOTE TEMS W TH PART NUMBERS MAY BE ORDERED SEPARATELY TEMS W TH K T NUMBERS (W THOUT SEPARATE PART NUMBERS) MUST BE ORDERED BY THE K T NUMBER N WH CH THEY ARE NCLUDED

PART NO	ITEMS 1,15,31,40,41,51	ITEM 3	ITEM 5	ITEMS 13,27	ITEM 16	ITEM 55	ITEM 63
5327000 1 PROP ACT ON)	1	5326961 1	5327115 1	OM T	1	OM T	13
5327000 2 (P + ACT ON)	1	5326961 1	5327115 1	1	OM T	4	17
5327000-3 (PROP ACT ON FOR FUNCT ON GENERATOR)	OM T	5326961 2	5327711 1	OM T	1	OM T	13

TYPE FC COMPUTER/CONTROLLER
PART NO. 5327150-□



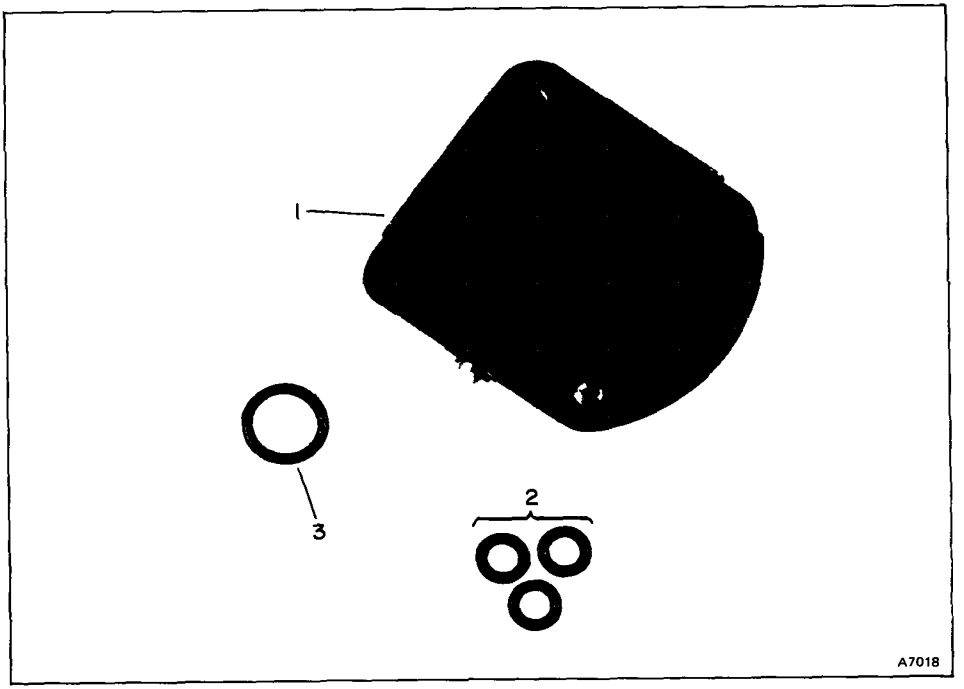
SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Parts Drawing P92-11-2 Computer/Controller, Type FC

ITEM	PART NO	NAME
1	5327136 1	CONTROLLER MOUNT
2	K T NO 258147 1	SEAL NG CORD
3	SEE TABLE	CONTROLLER ASSEMBLY
4	K T NO 258147 1	COVER
5	1962929 2	NAMEPLATE
6	K T NO 258147 1	RETAINING R NG 2 REQD
7	219x 500x 049	PLA N STN STL WASHER
8	190-32x 500	LG PAN HD STN STL MACH SCR
9	K T NO 258147 1	O R NG GASKET, 2 REQD
10	K T NO 258147 1	SCREW COVER
11	KIT NO 258147 1	SCREW, COVER

NAME	DESCRIPTION	ITEM 3
FC110	PROP (3 15 PS)	5327000 1
FC210	P+ (3 15 PSI)	5327000 2

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG BOOSTER SPARE PARTS KIT NO. 258141-1

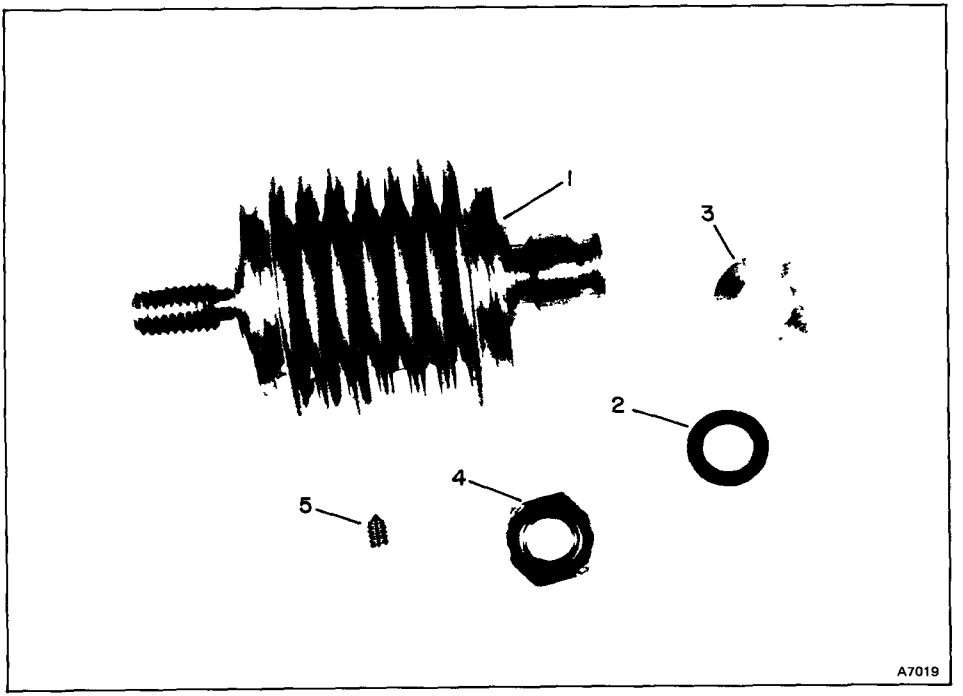


ITEM	NAME	QUANTITY
1	BOOSTER	1
2	O R NG	3
3	O RING	1

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company, U S A

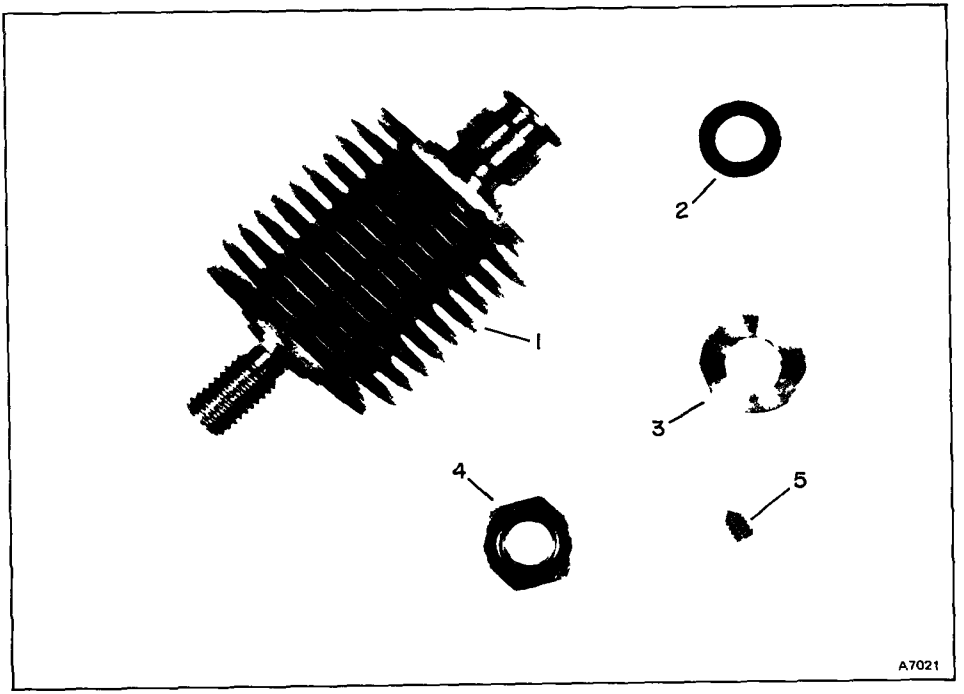
MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG A-B BELLOWS SPARE PARTS KIT NO. 258142-1



ITEM	NAME	QUANTITY
1	BELLOWS ASSEMBLY	1
2	O RING	1
3	SPRING WASHER	1
4	THIN NUT	1
5	112-40x 188 LG HEX SOC HDLS STN STL CONE PT SET SCR	1

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER TYPE FC AND FUNCTION GENERATOR, TYPE FG C-D BELLOWS SPARE PARTS KIT NO. 258143-1



ITEM	NAME	QUANTITY
1	BELLOWS ASSEMBLY	1
2	O R NG	1
3	SPR NG WASHER	1
4	TH N NUT	1
5	112-40x 188 LG HEX SOC HDLS STN STL CONE PT SET SCR	1

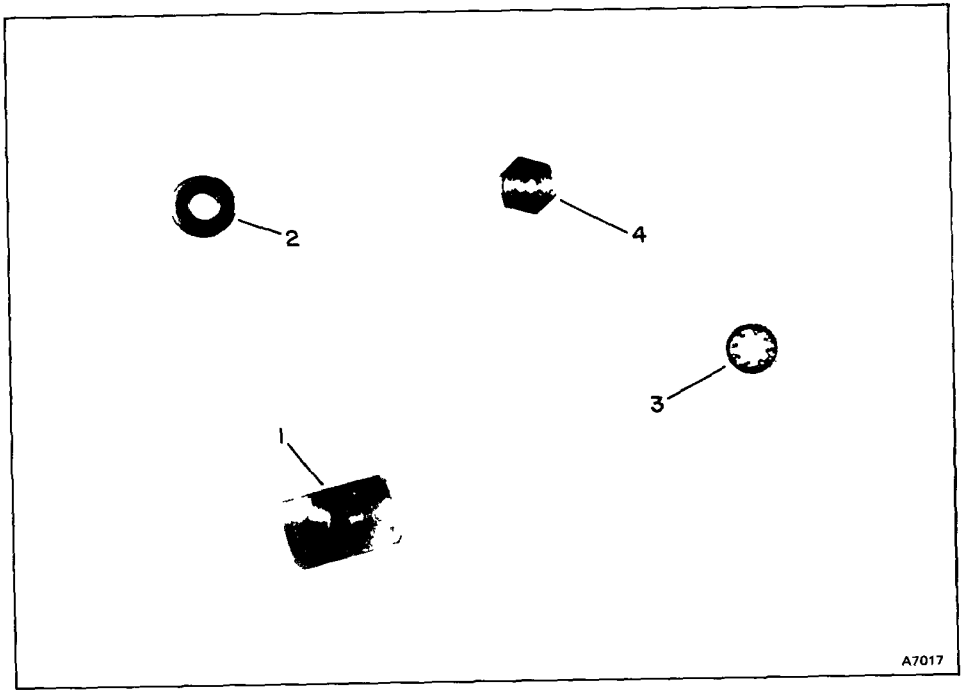
SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Form PD P92 11 5 L tho n U S A 378

Bailey Control Systems

Parts Drawing
P92-11-6

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG VANE PAD SPARE PARTS KIT NO. 258144-1

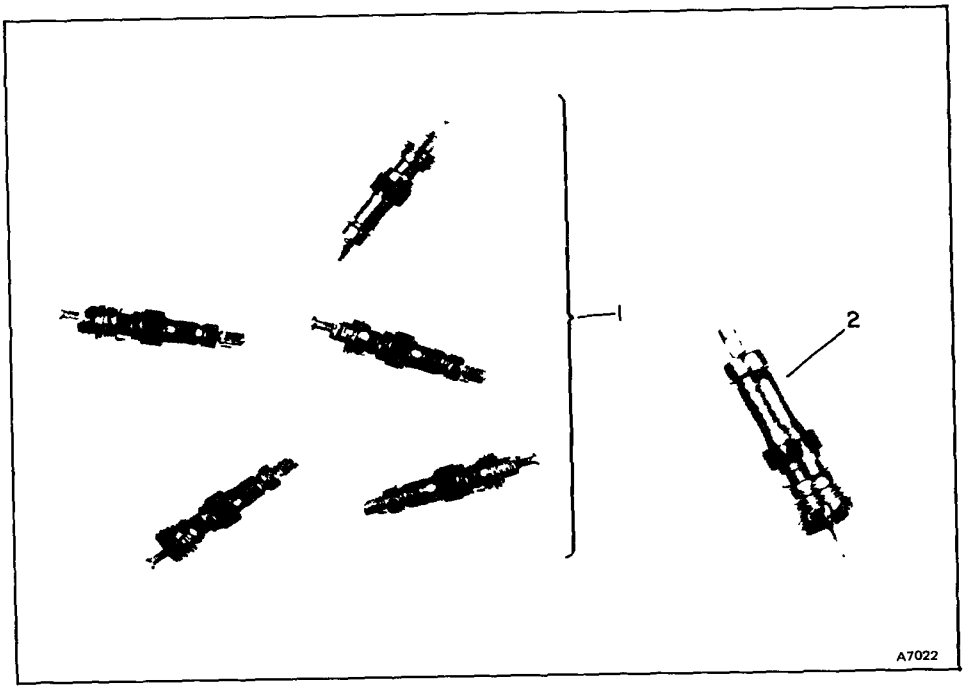


ITEM	NAME	QUANTITY
1	ADJUSTABLE VANE END	1
2	086 BRASS FLAT WASHER	1
3	1202-00 STN STL S'PROOF L'WASHER	1
4	086-56 BRASS HEX NUT	1

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company U S A

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG VALVE CORE SPARE PARTS KIT NO. 258145-1



ITEM	NAME	QUANTITY
1	VALVE CORE	5
2	VALVE CORE	1

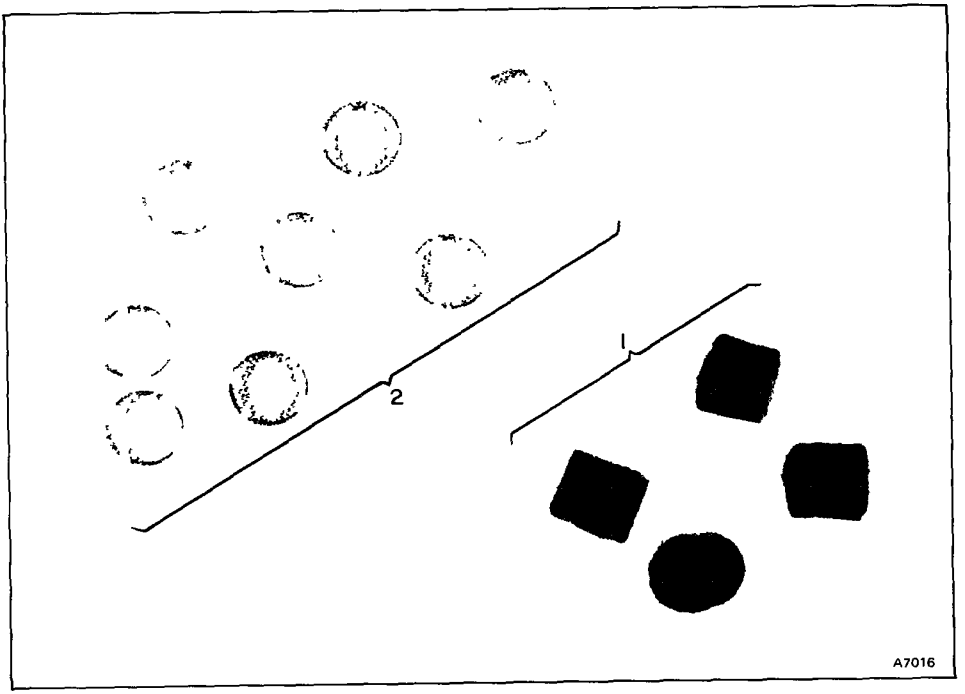
SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company U S A

Bailey Control Systems

Parts Drawing
P92-11-8

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG FILTER SPARE PARTS KIT NO. 258146-1

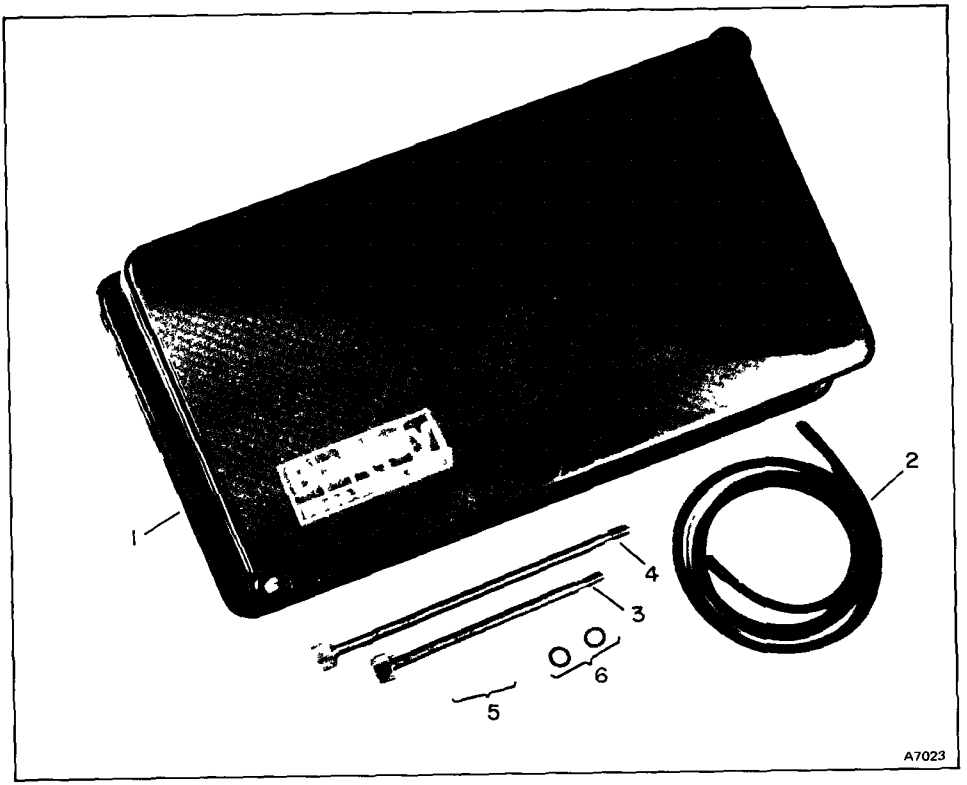


ITEM	NAME	QUANTITY
1	FELT PAD	4
2	W RE MESH D SC	8

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company U.S.A

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC
COVER SPARE PARTS
KIT NO. 258147-1



ITEM	NAME	QUANTITY
1	COVER	1
2	SEAL NG CORD	1
3	COVER SCREW	1
4	COVER SCREW	1
5	RETAIN NG R NG	2
6	O RING GASKET	2

Babcock & Wilcox
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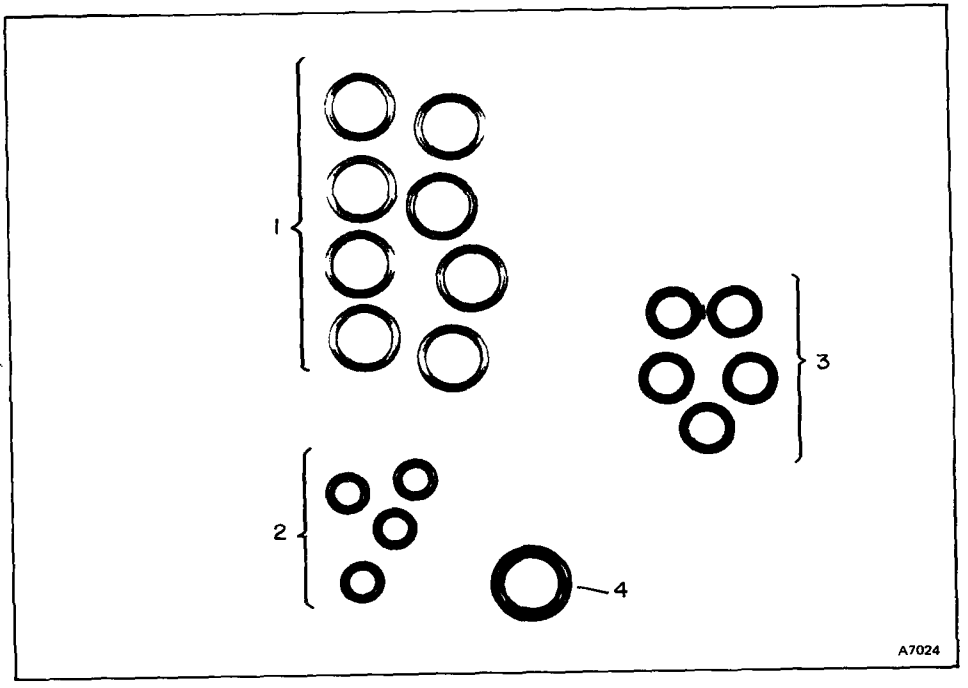
Bailey Control Systems

Parts Drawing
P92-11-10

MINI-LINE 520 PNEUMATIC COMPUTER/CONTROLLER, TYPE FC AND FUNCTION GENERATOR, TYPE FG O-RING SPARE PARTS KIT NO. 258148-1



ITEM	NAME	QUANTITY
1	O RING	8
2	O R NG	4
3	O RING	5
4	O RING	1

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

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