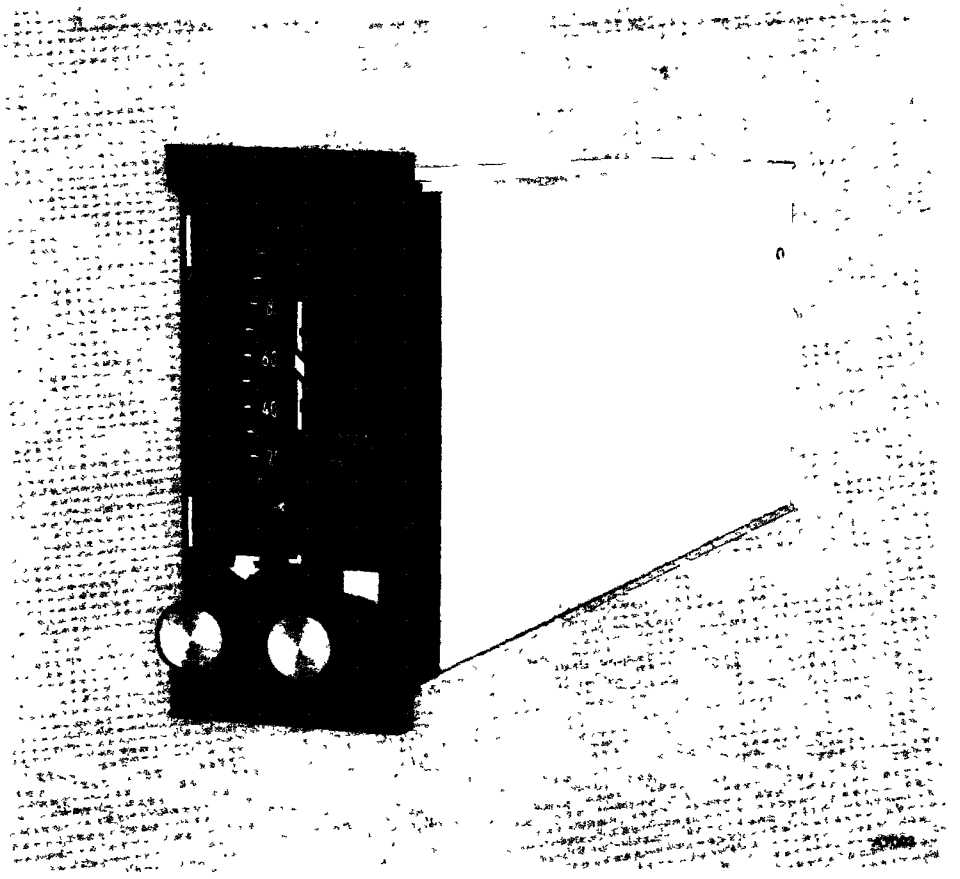
Mini-Line 520*
Manual/Automatic Transfer Station
Type FT



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Form P91 9 L tho n U S A 178

*Reg U S Pat Off ce

Babcock & Wilcox
Bailey Meter Company U S A

WARNING

NSTRUCT ON MANUALS

DO NOT NSTALL MA NTA N OR OPERATE TH S EQU PMENT W THOUT READ NG UNDERSTAND NG AND FOLLOW NG PROPER **Babcock & W cox Ba ey Meter Co U S A** *NSTRUCT ONS AND MANUALS* OTHERW SE NJURY OR DAMAG MAY RESULT

ATTENTION

MANUELS D OPERAT ON

NE PAS METTRE EN PLACE RÉPARER OU FA RE FONCT ONNER CE MATÉR EL SANS AVO R LU COM PR S ET SU V LES NSTRUCT ONS RÈGLEMENTA RES DE **Babcock & W cox Ba ey Meter Company, U S A** TOUTE NÉGL GENCE À CET ÉGARD POURRA T ÊTRE UNE CAUSE D ACC DENT OU DE DÉFA LLANCE DU MA TÉR EL

TABLE OF CONTENTS

	Page
INSTALLATION	2
PLACING IN SERVICE	6
ROUTINE MAINTENANCE	7
CALIBRATION	7
TROUBLESHOOTING	7
OPERATION	10
THEORY OF OPERATION	11
NOMENCLATURE	12
SPECIFICATIONS	13
REPLACEMENT PARTS	14

INSTALLATION

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 station is to be stored, repack in origi nal carton and store within temperature limits 20° to 120°F (7° to 49°C)

Pre Service Adjustment Check

CAUTION Before placing Station in service, check adjustment of vertical gage units as out lined below Also check calibration of gage units as outlined under "Troubleshooting", "Vertical Gage Unit Assembly" It is recommended that this check be performed at a test bench before the station is installed in the panel or placed in operation

ATTENTION Avant de mettre la station en service, verifier le reglage des elements de jauges verticales de la facon indiquee ci dessous Verifier egalement le calibrage des elements de jauge comme il est indique dans le chapitre "Depannage" sous le titre "Ensemble des jauges verticales" Il est recommande d'effectuer cette verification sur un banc d'essai avant d'installer la station sur le tableau ou de la mettre en service

Check that the indicating pointers of both vertical gages read slightly below minimum scale (0) If they do not, proceed as follows

1 Remove scale cover by prying outward on lip at top of cover

2 Adjust zero adjustment screws (Figure 3) through holes in scale using 5/64 inch Allen wrench until both pointers read minimum scale

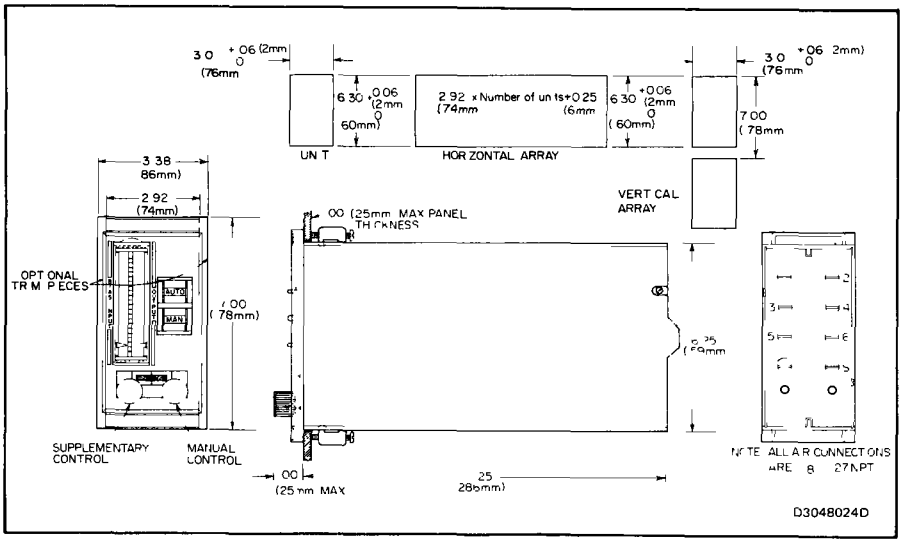


FIGURE 1 External and Mounting Dimensions, Manual/Automatic Transfer Station, Type FT

Time Sharing Valve

In set point and tie back stations (FT2□□ and FT3□□) the set point or tie back signals may be displayed on the right gage by pushing the supplementary (left) control knob. Make sure the time sharing valve is functioning properly by pushing the supplementary control knob and turning it while it is depressed.

1. Plug set point/tie back output (port 1).

2. Apply supply pressure to port (s), 18 or 30 psig.

3. Depress left knob and turn. Right gage should display output pressure.

Null Indicator Test Procedures

Before mounting the station in the panel, test the operation of the null indicator as follows.

Type FT1□□ Basic, FT2□□ Set Point and FT3□□ Tie Back Stations

1. Plug output ports 2 and 4.

2. Push "Auto" pushbutton on unit.

3. Apply supply pressure to port (s) on station. 18 psig (124 kPa) for 3 to 15 psi (20.7 to 103 kPa) or 30 psig (207 kPa) for 3 to 27 psi (20.7 to 186 kPa).

4. Apply input signal to port 6 until right indicator gage pointer reads 50% of scale.

5. Adjust manual regulator (right knob) until null indicator is balanced (white line on piston aligned with center of indicator).

Type FT4□□ Bias Station

1. Plug output ports 2 and 4.

2. Push "Auto" pushbutton on unit.

3. Apply supply pressure to port (s) on station. 18 psig (124 kPa) for 3 to 15 psi (20.7 to 103 kPa) or 30 psig (207 kPa) for 3 to 27 psi (20.7 to 186 kPa).

4 Adjust bias regulator (left knob) u ntil right gage pointer reads 50% of scale

5 Adjust manual regulator (right knob) until null indicator is balanced (white line on piston aligned with center of indicator)

After these checks are complete, the station is ready for panel mounting and external con nections as follows

Mounting and External Connections

1 Slide station through panel from front (Refer to Figure 1 for correct panel cutout dimensions)

2 Place mounting clips (Figure 1) in position and tighten securely against panel

3 Make external connections to rear of station with 1/8" 27 NPT pipe fittings as follows (Figure 4)

Connection #1	FT2 □□ Set Point Signal FT3 □□ Tie Back Signal
Connection #2	Station Output
Connection #3	Input for Tie Back or Reset Signal
Connection #4	Manual Regulator Output
Connection #5	Output for Tie Back or Reset Signal
Connection #6	Auto Input Signal (Control ler Output)
Connection #7	Measured Variable Input (Except FT4 □□)
Connection S	Station Air Supply

(For selection and installation of pneumatic connecting tubing or process connecting piping, refer to Bailey Product Instruction G18 1 or G18 2)

4 Remove protective tape from plastic scale covers Use a cleaning solvent (e g lighter fluid or kerosene) to remove any excess adhesive on scale cover Wipe off solvent with a damp cloth

CAUTION Apply solvent to scale covers only making certain fluid does not run or drip over trim pieces or station front plate Also, do not use solvents which will scratch cover finish or react with plastic cover (e g Ketones, Esters and Aro matic or Chlorinated solvents such as Carbon Tetrachloride, Chlorothene or Trichloroethy lene)

ATTENTION N'appliquer des dissolvants qu e sur les couvercles des graduations en faisant attention que le liquide ne coule pas n ne deborde sur les garnitures ou le pan neau avant de la station Ne pas utiliser non plus de dissolvants qui ris queraient de decaper le vernis des couvercles ou d'attaqu er les bo tiers en plastique (Dissolvants tels que les cetones, esters, dissolvants aromatiques ou chlores, comme le tetrachlorure de carbone, le chloretone ou le trichlorethylene)

5 Adjust air supply to 18 to 20 psig (124 to 140 kPa) for 3 to 15 psig (20 7 to 103 kPa) range
30 to 35 psig (20 6 to 241 3 kPa) for 3 to 27 psig (20 7 to 186 kPa) range See "Quality Standard for Instrument Air", 1975, ISA S7 3

Qua ity Standard for nstrument A r, 1975 SA S7 3

4 1 1 Outdoor nsta at ons (where any part of the nstrume nt a r system s exposed to the ou tdoor atmosphere

The dew po nt at ne pressure sha be at least 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 nsta ed ndoors)

The dew po nt at ne pressure sha be at least 10°C 18 F be ow the m n mum temperature to wh ch a ny part of the nstrument a r system s exposed at any season of the year n no case shou d 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

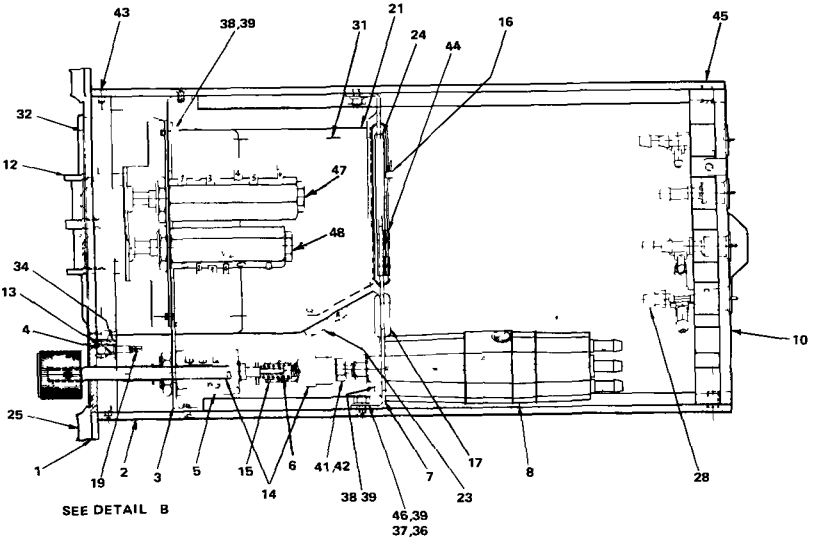
4 3 O Content

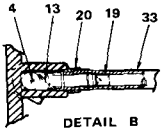
The max mum tota o or hydrocarbon content exc us ve of non co ndensab es sha be as c ose to zero (0 w/w or v/v as poss b e and under no c rcumstances sha t exceed one (1) ppm w/w or v/v under norma operat nc cond t ons

4 4 Contam nants

The nstrument a r sha b free of a corros ve contam nants and hazardous gases (a ab e o tox c wh ch may be drawn nto the nstrument a r stream f contam nat o ex sts n the compressor ntake area the a r shou d be taken from an e evat 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 qua ty nstrument a r

TYPE FT, MANUAL/AUTOMATIC TRANSFER STATION PART NO 5327080-□

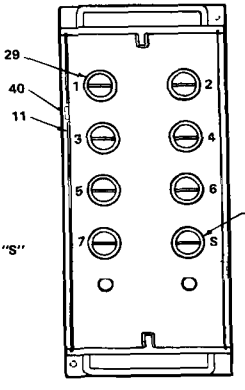


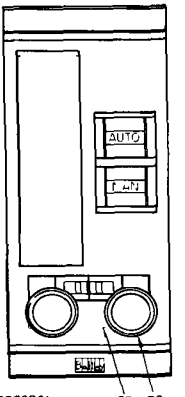


DETAIL B

(2 REQ'D FOR CONNECT ON "S" ALL OTHER CONNECT ONS REQUIRE ONLY 1)

DETAIL A





D5327080L

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

rawing P91-9-1 Manual/Automatic Transfer Station Type FT

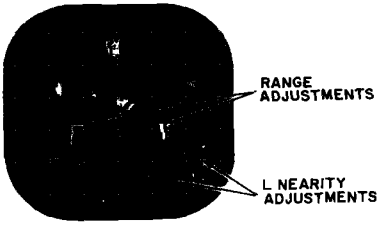
TEM	PART NO	NAME
1	5327081 1	FRONT PLATE
2	5327082 1	FRAME PLATE, 2 REQD
3	5327078 1	SW TCH GAGE CHASS S
4	K T NO 258157 1	NULL ND CATOR
5	5327070 2	3 WAY PNEUMAT C SW TCH (SEE TABLE
6	5326873 1	SW TCH RETURN SPR NG (SEE TABLE)
7	5327096 1	REGULATOR BRACKET
8	SEE TABLE	REGULATOR ASSY SEE TABLE
9	K T NO 258159 1	W RE MESH D SC 9 REQD
10	5327077 1	CONNECTOR ASSY
**	5327079 *	S DE COVER 2 REQD
12	K T NO 258158 1	PUSHBUTTON
13	K T NO 258157 1	CL P 2 REQD
14	5327104 1	SHAFT EXTENDER (SEE TABLE
15	5327097 1	SHAFT COUPL NG (SEE TABLE
16	1943785 5	CABLE T E
17	67125 7	RUBBER GROMMET
*18	K T NO 258153 1 AND 258154 1	COMPRESS ON CL P (SEE TABLE
19	5325032 2	OR F CE 2 REQD
*20	K T NO 258155 1 AND 258156 1	COMPRESS ON CL P (SEE TABLE)
21	SEE TABLE	DOUBLE PO NTER GAGE
22	K T NO 258159 1	FELT PAD
23	1951533 1	F TT NG TUBE 2 REQD
24	531428 3	BUMPER STR P
25	1962851 1	LOGO
26	198494 5	KNOB (SEE TABLE
*27	1951529 1	F TT NG TEE SEE TABLE
28	1951409 1	TUBE CAP SEE TABLE)
29	*945750 2	PLUG, 8 REQD
*30	1951531 1	F TT NG TEE
31	SEE TABLE	TUB NG D AG LABEL
32	SEE TABLE	STYLE PLATE
*33	R9025 0426	094 D x 156 O D CLEAR POLYUR TUB NG 36
34	R9910 0022	031 THK x 250WD PRESSURE SENS T VE BLACK FOAM TAPE 38
*35	R9025 0410	172 D x 297 O D CLEAR POLYUR TUB NG (SEE TABLE
36	138	STN STL FLAT WASHER 4 REQD
37	112-40	STN STL HEX NUT 4 REQD
38	112-40x 250	LG HEX SKT HD STN STL CAP SCR SEE TABLE)
39	112	HEL CAL SPR STN STL LOCKWASHER (SEE TABLE)
40	112-40x 188	PAN HD CD PL STL SEMS EXT 2 REQD
41	190 32	STN STL HEX NUT SEE TABLE
42	1210 00	CD PL STL SHAKE PROOF LOCKWASHER (SEE TABLE
43	112 40x 25	LG PH LL PS FLAT HD STN STL MACH SCR 12 REQD
44	190 32x 375	LG PAN HD CD PL STL SEMS EXT 2 REQD
45	190 32x 375	LG PH LL PS FLAT HD STN STL MACH SCR 4 REQD
46	112-40x 375	LG PH LL PS FLAT HD STN STL MACH SCR 4 REQD
47	5327094 1	2 & 3 WAY VALVE
48	5327069 1	4 WAY SW TCH

*THESE TEMS NOT SHOWN ON DRAW NG

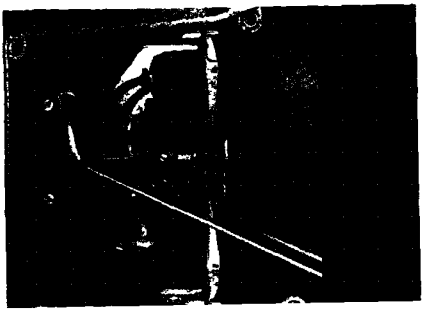
PART NO	DESIGNATION	USAGE	ITEM 14	ITEMS 5,6 & 15	ITEMS 41 & 42	TEM *18	ITEM *20	ITEM 21	* TEM 35
5327080 1	BAS C	FT11□	1	OM T	1	22	12		144 NCHES
5327080 2	SET PO NT	FT21□	1	1	2	28	16	K T NO 258155 1	156 NCHES
5327080 3	T EBACK	FT31□	1	1	2	28	16		156 NCHES
5327080-4	B AS	FT41□	2	OM T	2	27	12		156 NCHES
5327080 5	BAS C	FT12□	1	OM T	1	22	12		144 NCHES
5327080-6	SET PO NT	FT22□	1	1	2	28	16	K T NO 258156 1	156 NCHES
5327080 7	T EBACK	FT32□	1	1	2	28	16		156 NCHES
5327080-8	B AS	FT42□	2	OM T	2	27	12		156 NCHES

ITEM *27	TEM 28	TEM 31	TEM 38	TEM 32	TEM E	ITEM 26	TEM 39
1	1		8	1962940 1	1	1	12
2	OM T		12	1962940 2	K T NO 258153 1 2	2	16
2	OM T		12	1962940 3	2	2	16
2	OM T	K T NO 258155 1	12	1962940-4	2	2	16
1	1	AND 258156 1	8	1962940 1	1	1	12
2	OM T		12	1962940 2	K T NO 258154 1 2	2	16
2	OM T		12	1962940 3	2	2	16
2	OM T		12	1962940-4	2	2	16

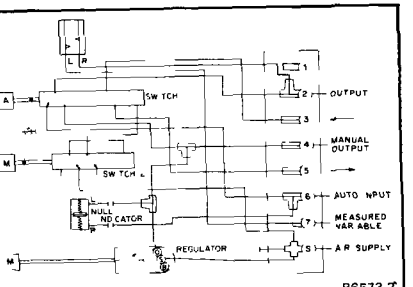
NOTE TEMS W TH PART NUMBERS MAY BE ORDERED SEPARATELY TEMS W TH K T NUM BERS W THOUT SEPARATE PART NUMBERS) MUST BE ORDERED BY THE K T NUMBER N WH CH THEY ARE NCLUDED



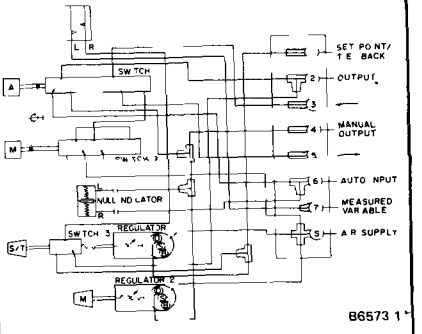
F GURE 2 Range and L near ty Adjustments, Type FT Manual/Automatic Transfer Stat on



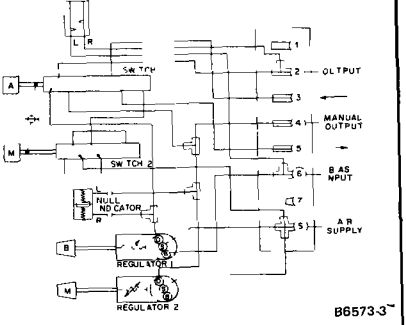
F GURE 3 Zero Adjustments, Type FT Manual/Automatic Transfer Station



BASIC STATION



SET POINT/TIE BACK STATION



BIAS STATION

F GURE 4 External Connect on and Tub ng Diagrams, Manua /Automat c Transfer Stat on, Type FT

PLACING IN SERVICE

After the station has been installed in the control panel

1 Turn on supply pressure to station

2 Check all external tubing connections for leakage with a soapsuds solution

3 Adjust manual control (right) knob on front plate (Figure 5) until desired output is indicated on vertical gage

NOTE See applicable heading below for typical applications

Basic M/A Transfer Station

A signal pressure proportional to the measured variable, is applied to the controller The controller output pressure is transmitted thru the M/A Station to the power unit

Set Point M/A Transfer Station

A signal pressure, proportional to the measured variable, is applied to the controller Output pressure of the controller is transmitted thru the M/A Station to the power unit Set point pressure is applied to the controller by the M/A Station set point control knob The controller is balanced when the measured variable signal pressure and the set point pressure are equal Comparison of the readings on the left and right gages indicates whether the system is at set point

When the M/A Station is in the manual position, a tie back pressure is provided to the controller The tie back pressure holds the controller output pressure approximately equal to the control pressure allowing smooth transfer to automatic operation

Tie Back M/A Transfer Station

A readjusting signal pressure is applied to the controller The output pressure is combined with the primary signal pressure in a Proportional Controller, and applied thru the M/A Station to the power unit

When operating in manual, this pressure is

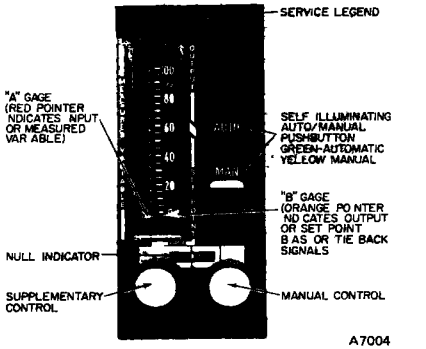


FIGURE 5 Type FT Manual/Automatic Transfer Station

cut off and the power unit is controlled by the manual regulator Tie back pressure is then applied to the controller Adjustment of the tie back knob (left) then varies the pressure in the controller which, in turn, varies output pressure of the Proportional Controller Bumpless transfer from manual to automatic may then be accomplished by adjusting the tie back regulator until the left gage pressure equals the right gage pressure (with tie back, left, knob depressed)

Bias M/A Transfer Station

A signal pressure proportional to the measured variable, is applied to the controller Set point pressure (if remote set point control is required) is also applied to the controller Output pressure of the controller is transmitted to the Bias regulator of the M/A Transfer Station and then to the power unit

When a controller precedes the M/A Transfer Station in the control system, tie back pressure from the M/A Station is returned to the controller Pressure is applied to the controller only when the M/A Station is in manual This tie back pressure holds the output pressure of the controller (during manual control) approximately equal to the control pressure, allowing smooth transfer from manual to automatic

ROUTINE MAINTENANCE

Air supply must be kept free of dirt, oil and moisture for satisfactory operation Inspect felt filters at rear of station and replace them if they are dirty (Figure 6) Frequency of filter replacement will depend on the quality of 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

When necessary replace felt pad air filters as follows

1 Turn off supply air and disconnect supply air and output lines

2 Remove fittings

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

4 Replace felt pads and wire mesh discs

5 Replace fittings

6 Reconnect supply air and output lines to mounting base

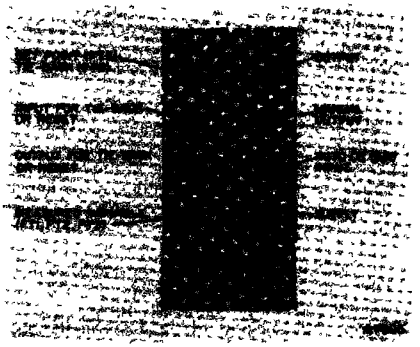


FIGURE 6 Supply, nput and Output Ports for Manua /Automat c Transfer Station, Type FT

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

When necessary, clean acrylic scale cover as described under "Installation", "Mounting and External Connections"

CALIBRATION

Calibration procedures for the Vertical Gage Unit Assembly are found under "Troubleshooting" in this manual Calibration of the Pressure Regulator Assembly is performed at the factory If any adjustment is necessary the entire unit should be removed and returned to the factory Follow the procedure outlined under "Trouble shooting", "Removal and Replacement of Pressure Regulator Assembly"

No calibration is necessary for the null indicator, transfer valve or time sharing valve assemblies

TROUBLESHOOTING

If operational faults occur which are traced to the following assemblies, make the listed adjustment checks found under the particular assembly

Vertical Gage Unit Assembly

1 Remove side covers from station by removing retaining screws and sliding covers to rear

2 Remove rear snapout cover (Parts Drawing P91 10 2, Item 12), slide cover and scale cover from vertical gage assemblies for access to adjustments (Figures 2 and 3)

3 Position station at angle at which it will be mounted in service and check adjustment of input and output pointers beginning with (a)

NOTE Apply regulated pressures with +1 ⁄ input gage accuracy and check for leakage with a soapsuds solution If a leak is found replace the entire gage unit The defective unit should be returned to the factory for repair Refer to sec tion titled "Removal and Replacement" for this procedure

Make sure all links are properly connected and that they move freely with bellows beam movement Also make sure that the indicating pointers do not rub against he side or face of scale If necessary, bend the pointer slightly until it clears scale

a Basic Station FT1□□ To read left hand pointer apply input to port (7) To read right hand pointer apply supply pressure to port(s) Plug port (6) and port (4), and install test gage at port (2) Place station in manual mode Adjust stations manual control and compare vertical gage against test gage

b Tie Back or Set Point Station FT2□□ or FT3□□ To read left hand pointer apply input to port (7) To read right hand pointer apply supply pressure to port (5) Plug port (6) and port (4) and install test gage at port (2) Place station in manual mode Adjust station's manual control and compare vertical gage against test gage

c Bias Station FT4□□ To read left hand pointer apply input to port (6) To read right hand pointer apply supply pressure to port (5) Plug port (4) and install gage at port (2) Place station in manual mode Adjust station's manual control and compare vertical gage against test gage

d Apply pressure to gage, equivalent to first major scale division above 0% scale If pointer does not read correctly, turn zero adjustment screw until desired reading is obtained This adjustment is accessible from front of station by removing scale cover and inserting a 5/64 inch Allen Key into holes in scale

e Apply pressure to gage equivalent to first major scale division below 100% scale If pointer does not read correctly, turn range adjustment screw until desired reading is obtained

f Repeat steps d and e until pointer reads correctly at both scale divisions

g Apply pressure to gage equivalent to mid scale division If pointer does not read correctly, but does read correctly in steps d and e above, adjust angularity pivot shaft to

1 Increase pointer reading if it is low or,
2 Decrease pointer reading if it is high

Repeat steps a thru g until pointer reads correctly over full scale

4 Apply pressure to gage corresponding to maximum scale value plus 0 25 psig (1 7 kPa) (Pointer will read slightly above maximum scale mark) Loosen maximum stop screws (Parts Drawing P91 10 2, Item 31) and position overtravel stop bracket (Item 28) against nut which retains range spring to bellows beam Retighten screws

5 Apply 2 8 psig (19 3 kPa) to gage (Pointer will read slightly below minimum scale mark) Turn elastic stop nut against overtravel stop bracket

6 Replace side cover on vertical gage Re position snapout cover and press into place Re place station side covers

Removal and Replacement of Vertical Gage Unit Assembly and Null Indicator Assembly

1 Remove vertical gage scale cover (Parts Drawing P91 10 2 Item 6), regulator knobs (Parts Drawing P91 9 1, Item 26) and eight flat head screws (Item 43)

2 Remove front plate (1)

NOTE Tubing connected to null indicator mounted in front plate should not be stressed

3 If it is necessary to remove null indicator assembly from front plate, remove both re taining clips (Parts Drawing P91 9 1, Item 13) and free indicator from front plate

4 Remove tubing from assembly and replace indicator New tubing and clamps are supplied with new null indicator

5 Remove two screws (44)

6 Disconnect tubing from vertical gage fittings and remove unit from station

7 Install new gage by reversing above procedure New tubing and clamps are supplied with new vertical gage unit

Removal and Replacement of Pressure Regulator Assembly (Parts Drawing P91 9 1, Item 8)

In the event the pressure regulator becomes inoperative the unit should be removed in the following manner and returned to the factory

1 Remove side covers from station by removing retaining screws and sliding covers to rear

2 While holding shaft extender (14) loosen jam nut (41)

3 Remove four screws (39) which hold regulator in place

4 While holding elastic stop nut, rotate shaft extension by turning control knob on front of station

5 When regulator adjustment shaft is free of shaft extension, remove tubing from end of regulator and remove regulator from station

6 Install new regulator by reversing above procedure New tubing and clamps are supplied with new regulator

Transfer Valve Assembly O Ring Replacement (Parts Drawing P91 9-4)

1 Remove side covers from station by removing retaining screws and sliding covers to rear

2 Remove eight screws holding front plate to upper and lower frame plates

3 Remove control knobs on front plate by loosening hex screws

4 Disengage plastic barbs of pushbutton housing from metal bracket (Item 1) and move front plate aside When moving front plate, do not stress null indicator tubing

5 Pull pushbutton assembly and valve spools out front of station

4 Replace o rings as required (part no 341816 7)

5 Reinstall by reversing above procedure

Time Sharing Valve Assembly O Ring Replacement (Parts Drawing P91 9 1, Item 5)

1 Free pressure regulator assembly (Item 8) from mounting plate by loosening four screws

2 Slide regulator assembly to rear of station to free shaft of time sharing valve

3 Remove "C" ring at front of time sharing valve

4 Remove knob from front of shaft with hex key (5/64)

5 Pull shaft from time sharing valve housing by sliding shaft towards rear of station

6 Replace O rings as required

7 Reinstall by reversing above procedure

OPERATION

The Type FT Manual/Automatic Transfer Station provides a means of manually and automatically adjusting a pneumatic output signal for remote control of final elements, or generation of set point or tie back signals and positive or negative biasing of an input signal

The station consists of 1 A double pointer vertical indicator gage 2 One pressure regulator for basic stations and two regulators for set point tie back and bias station applications 3 A precision null indicator 4 A transfer valve assembly to effect changes between manual and automatic operation 5 A time sharing valve assembly on set point and tie back stations

Four variations of the M/A Transfer Station are available in 3 to 15 psig (20 7 to 103 kPa) or 3 to 27 psig (20 7 to 186 kPa) signal ranges The Basic M/A Transfer Station includes an M/A pushbutton transfer switch Output of the station and a measured variable are continuously displayed on the indicator gage Set Point and Tie Back Transfer Stations provide M/A pushbutton transfer and continuous display of a measured variable Set point and tie back signals are generated and displayed with the output signal on demand These serve as set point signals for a pneumatic controller or as a tie back signal for feed forward or cascade control loops The Bias Station provides pushbutton M/A transfer capabilities and applies a positive or negative bias to the output control signal The input signal and the biased output are continuously displayed

Vertical Gage Unit

The double pointer vertical gage displays either the station input or a measured variable on the left scale and either the station output or set point, bias or tie back signals on the right scale (Figure 5) The gage uses a spring opposed bellows assembly to convert the pneumatic signals to pointer positions

CAUTION To effect auto/manual and manual/auto transfer, conditions within the control system must be set so there is little or no variation in control pressure as transfer takes place

ATTENTION Pour proceder au transfert de automatique sur manuel et de manuel sur automatique il importe que le reglage a l'interieur du systeme de controle soit tel qu'il ne se produise que peu ou pas de variation dans la pression de controle au moment ou s'effectue le transfert

Auto/Manual Transfer

1 Adjust manual control (right control knob) until null indicator is centered (When centered white band on piston of null indicator will be centered on index mark on station front plate)

2 When null indicator is centered, depress pushbutton marked manual, to effect transfer

Manual/Auto Transfer

1 Slowly adjust manual control until null indicator is centered

2 When null indicator is centered, depress pushbutton marked auto to effect transfer

CAUTION The following alternate transfer procedures should be used only when the M/A Station transfer pressure (system set point, bias or controller output) may be changed without endangering the process

ATTENTION La methode de remplacement ci apres pour proceder au transfert doit etre utilisee seulement lorsqu'il est possible de modifier la pression de transfert (repere, polarisation ou sortie de regulateur) sans risque pour le deroulement de l'operation

Alternate Manual/Auto Transfer

Bias Station

1 Slowly adjust bias regulator (left knob) until null indicator is centered

2 Push auto pushbutton to effect transfer

3 Return bias to desired value

Set Point Station

1 Push set point control (left knob) to engage set point regulator and adjust regulator until null indicator is centered

2 Push auto pushbutton to effect transfer

3 Return set point to desired value

Time Sharing Valve Assembly

In set point and tie back stations the right gage normally displays the station output By means of a time sharing valve located behind the supplementary (left) control knob the set point or tie back signals may be displayed on the right gage and changed in the following manner

To display set point or tie back signal

1 Push supplementary (left) control knob

2 Release of supplementary control knob allows station output signal to return to right gage

To adjust set point or tie back signal

1 Push supplementary (left) control knob

2 Keep knob depressed and turn slowly to engage set point/tie back regulator

3 Observe signal changes on right gage

4 Release of supplementary control knob allows station output signal to return to right gage

NOTE When supplementary control knob is released, adjustment will have no effect on the set point or tie back signals The knob must be pushed to effect a change

THEORY OF OPERATION

A Bailey Type PS Double Pointer Gage (Parts Drawing P91-10 2) displays the actual signal magnitude The left pointer displays either bias input or a measured variable The right pointer displays station output or, set point, tie back or bias signals The gage itself, employs a spring opposed bellows assembly to convert pneumatic signals to pointer positions Access to zero adjustments is provided through the front of the station by removing the gage scale cover and inserting an Allen wrench through the holes provided in the scale

The regulator (Figure 7) is a miniature, multi stage, precision pressure regulator A force balance system compares the input with a feedback force produced by the output The input may be the result of loading by the range

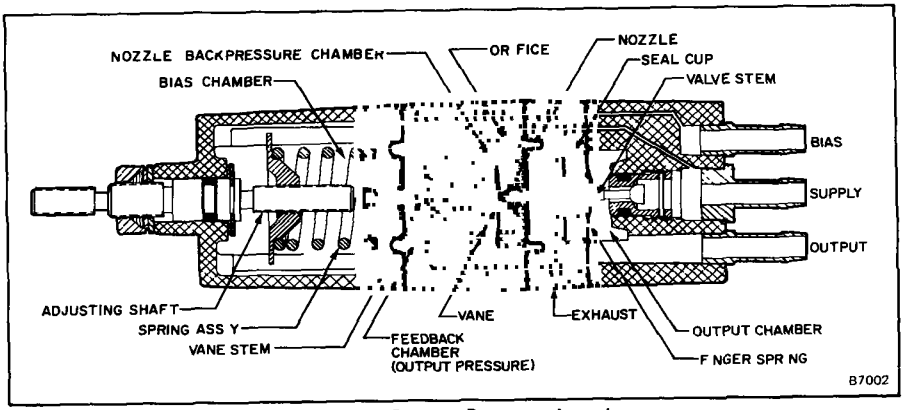


FIGURE 7 Pressure Regu ator Assemb y

spring assembly or from a bias input pressure in the bias chamber, or a combination of both An unbalance between the input(s) at the output causes deflection which is transmitted to the second stage by the vane stem

The nozzle assembly may be considered an "operator" for the second stage The vane stem deflects the vane which seals off the nozzle The resulting change in backpressure moves the nozzle assembly and the output valve stem This "power assist" effect of the moving vane and nozzle assembly provides greater capacity and better accuracy of the output pressure with respect to the input(s)

Operation of the output valve stem supplies or exhausts output air until the output pressure feedback to the first stage brings the unit to balance at an output pressure which corresponds to the new input

The ability of the nozzle to move with the second stage provides a minor feedback loop which provides for greater regulator stability

The Null Indicator (Parts Drawing P91 9 5) indicates the deviation between the incoming auto signal and the manual output signal and permits the signals to be balanced for bumpless transfer The signals are applied to opposite ends of a piston/cylinder assembly When signals are balanced, springs position the piston at mid stroke and in alignment with an index mark on the front plate Unbalanced signals cause piston motion (approximately 0 2 in /psi differential) which is viewed through an opening in the front plate and also through the glass cylinder

A color coded, mode indicating pushbutton and transfer valve assembly permits transfer between automatic and manual control The push button assembly is a push pull device made of polycarbonate plastic The mode of control, either automatic or manual, is indicated by the color (green for automatic, yellow for manual) visible in the pushbutton lens The lens has a prismatic effect which allows color visibility only when the pushbutton is depressed

The pushbuttons are connected to a pair of brass spool valves which effect the transferring function A pneumatic detent feature built into the spool valves insures positive transfer and eliminates the possibility of stopping the transfer action between modes

In the Basic station, the left gage pointer displays the measured variable and the right gage pointer displays the station output

In the Set Point and Tie Back stations, the left pointer displays the measured variable A brass spool valve permits time sharing of the right pointer When the set point or tie back knob is in the normal position, the station output (automatic to the final control element) is displayed by the right gage pointer When the knob is depressed (as is necessary when adjusting the signal) the set point or tie back signal is displayed by the right gage pointer The time share spool valve is spring loaded Releasing the knob returns the station output to the right gage pointer and disconnects the knob from the set point or tie back signal This feature permits the display of two variables using a single pointer and also prevents accidental changing of the set point or tie back signal

In the Bias station, the left gage pointer displays the automatic signal and the right gage pointer displays station output The difference between the two readings is the amount of bias applied to the automatic signal

NOMENCLATURE

Digit 1 2 3	Description
F**	Manual /Automatic Transfer Station
1	Basic
2	Set Point
3	Tie Back
4	Bias
1	3 to 15 psig (20 7 to 108 kPa) Output
2	3 to 27 psig (20 7 to 186 kPa Output
0	Standard 0 to 100% scale
5	Direct Reading Scale

SPECIFICATIONS

Accuracy† (Bias Regulator)	±2% of span at ±50% bias
Indicator Gage	±1% of span
Output Signal Ranges	3 15 psig 20 7 to 103 kPa or 3 27 psig 20 7 to 186 kPa)
Air Supply	For 3 15 psig (20 7 to 103 kPa) signal range 18 to 20 psig (124 to 138 kPa) recommended 25 psig (172 kPa) maximum For 3 27 psig (20 7 to 186 kPa) signal range 30 psig 207 kPa) recommended 35 psig 241 kPa maximum
Steady-State Air Consumption	1 scfm (472 x 10 $^{4}m^{3}/S$) per regulator maximum
External Connections	1/8' 27 NPT female
Operating Temperature Ranges	Normal Operating 40° to 120° F (4 4° to 49°C Operating Limits 20' to 140°F (6 7° to 60°C)
Mounting	Mounts directly into panel cutout
Temperature Effect	±2 0% per 100°F 37 8°C)
Regulator Supply Capacity	0 5 scfm 2 36 x 10 $^{4}m^{3}/S$) for 1 psi increase in output pressure minimum at mid range
Regulator Exhaust Capacity	0 3 scfm (1 42 x 10 $^{4}m^{3}/S$) for 1 psi drop in output pressure minimum at mid range
Vibration Effect	Tested in accordance with MIL STD 167B (SHIPS)
Scale Length	3 3/16 (81 mm)
Size	2 92 ' W (74 mm) x 6 25' H 159 mm) x 11 25 D (286 mm)
Weight	Basic Station Net Weight 5 69 lbs (2 58 kg) Shipping Weight 6 69 lbs (3 04 kg) Set Point Station 6 56 lbs (2 98 kg Shipping Weight 7 56 lbs (3 43 kg) Tie Back Station 6 56 lbs (2 98 kg) Shipping Weight 7 56 lbs (3 43 kg) Bias Station 6 31 lbs 2 86 kg 7 31 lbs (3 32 kg)

†As defined by SAMA Standard PMC20 1

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

REPLACEMENT PARTS

Ordering I ndividua Parts

The follow ng are Parts Drawings of the Type FT Manual/Automatic Station and its spare parts kits Ite ns with part numbers may be ordered separately Items with kit numbers (without separate part numbers) mu st be ordered by the kit number in which they are incl ded

Normally, these drawings app v to the unit furnished However there may be individual differences n specif c units because of

a design changes made s nce the printing of this instruction section, or

b special design of the station 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 nomenc ature and series number of equipment for which parts are desired, and

b the Parts Drawing nu nber and title on which each part s illustrated (e g Parts Drawing P91 9 1, Type FT Ma nual/Au tom it c Transfer Station, Part No 5 327080 □)

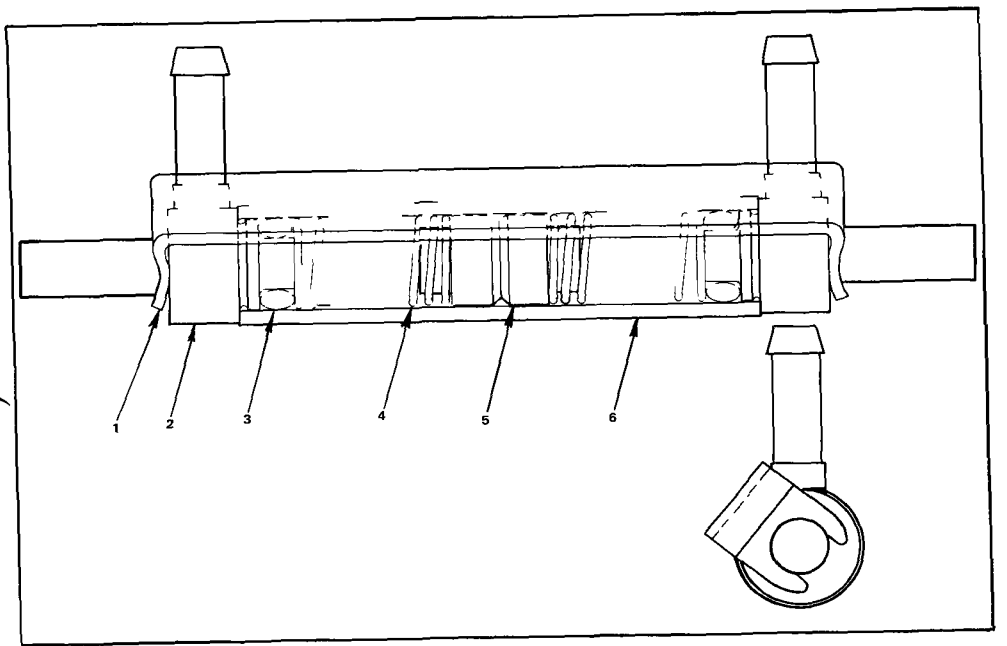
Recommended Spare Parts

The following listed spare parts kits and individual parts should be stocked in the quanti ties listed

KIT NO	NAME	QUANT TY
258153 1 (3 15 PS G RANGE) OR	REGULATOR	1
258154 1 3 27 PS G RANGE)	REGULATOR	1
258155 1 (3 15 PS G RANGE OR	DOUBLE PO NTER GAGE	1
258156 1 3 27 PS G RANGE)	DOUBLE PO NTER GAGE	1
258159 1	F LTER	1
258160 1	O R NG	1
256028 1	COVER	1

PART NO	NAME	QUANTITY
198494 5	KNOB	1

NULL INDICATOR ASSEMBLY
SPARE PARTS KIT
NO. 258157-1



SPARE PARTS KIT NO 258157 1

TEM	NAME
1	CLAMP
2	CAP ASSY 2 REQD
3	O R NG 2 REQ D
4	SPR NG BALANCE 2 REQ D
5	P STON
6	CYL NDER

ITEM	NAME	QUANT TY
7	NULL ND CATOR ASSEMBLY	1
*8	MOUNT NG CL P	2
*9	POLYURATHANE TUB NG 11)	2
*10	OR F CE	2
*11	COMPRESS ON CL P	4

*NOT LLUSTRATED

NOTE THE NULL ND CATOR (PART NO 5327818 1) WHEN NEEDED AS A REPLACEMENT OR SPARE PART MUST BE ORDERED AS PART OF SPARE PARTS K T 258157 1 PARTS NCLUDED N K T NO 258157 1 ARE L STED

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

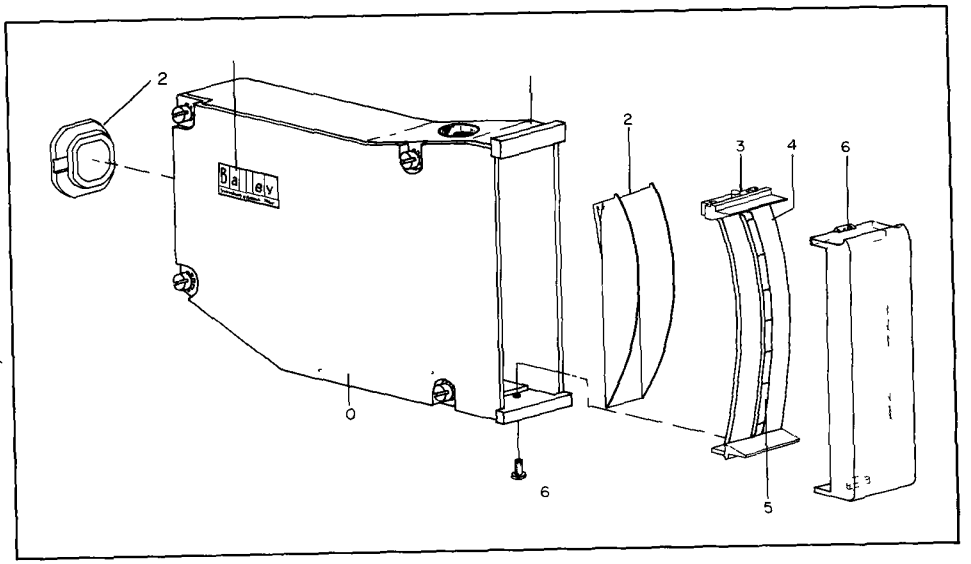
Babcock & Wilcox
Ba ley Meter Company U S A

Form PD P91 9 5 L tho n U S A 278

Bailey Control Systems

Parts Drawing
P91-10-2

DOUBLE POINTER GAGE
SPARE PARTS KITS
NO. 258155-1 (3 TO 15 PSIG), NO. 258156-1 (3 TO 27 PSIG)



ITEM	PART NO	NAME
1	K T NO 258155 1 OR K T NO 258156 1	DOUBLE PO NTER GAGE, PER ENG DATA SEE NOTE
2	5327221 2	REFLECTOR
3	5327218 1	SCALE HOLDER
4	PER ENG DATA	SCALE
5	PER ENG DATA	SCALE RIB
6	K T NO 256028 1	SCALE COVER
10		NAMEPLATE
11		STYLEPLATE
12	5327888 1	SNAPOUT COVER
16		112-40x3/8 PAN HD SCR TYPE 1

SPARE PARTS KIT NO 256028 1

ITEM	NAME	QUANTITY
6	SCALE COVER	2

SPARE PARTS KIT NO 258156 1 (3 TO 27 PSIG RANGE)
SPARE PARTS KIT NO 258155 1 (3 TO 15 PSIG RANGE)

TEM	NAME	QUANTITY
1	DOUBLE PO NTER GAGE	1
*17	POLYURATHANE TUBING (20)	1
*18	COMPRESS ON CL PS	4
*19	TUB NG D AGRAM LABELS	5
*20	GAGE F TT NGS	2
*21	FORM	1

*NOT LLUSTRATED

NOTE THE DOUBLE PO NTER GAGE (PART NO 5327894 □) WHEN NEEDED AS A REPLACEMENT OR SPARE PART MUST BE ORDERED AS PART OF SPARE PARTS K T 258155 1 (3 TO 15 PS G/ 20 7 to 103 kPa) OR SPARE PARTS K T 258156 1 (3 TO 27 PS G/20 7 TO 186 kPa) PARTS INCLUDED IN THESE K TS ARE LISTED

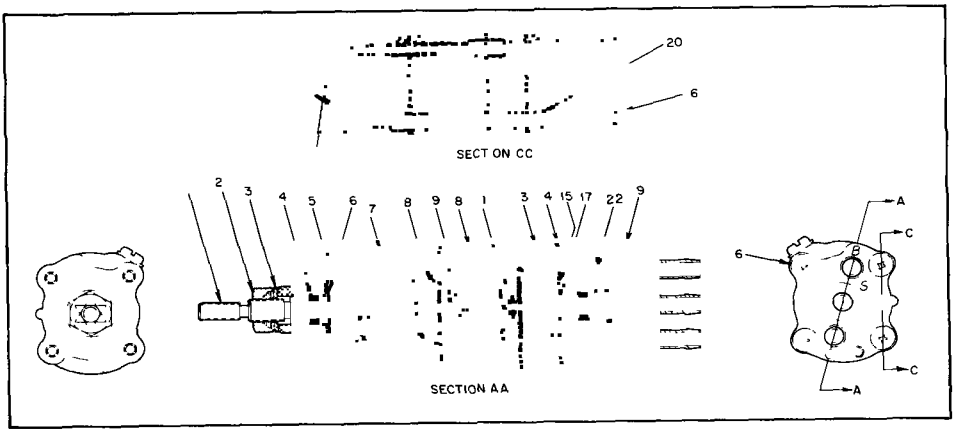
SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company U.S.A

Bailey Control Systems

Parts Drawing
P91-10-3

REGULATOR ASSEMBLY
SPARE PARTS KITS
NO. 258153-1 (3 TO 15 PSIG), NO. 258154-1 (3 TO 27 PSIG)



ITEM	NAME
1	SHAFT ADJUST MENT
3	WASHER, NYLON
4	O R NG
5	WASHER LATCH
6	R NG RETA N NG
7	SPR NG
8	SPR NG ASSY
9	STEM VAN-
11	NOZZLE ASSY
13	NOZZLE
14	GASKET
15	CUP, SEAL
16	SCREW SEAL NG 4 REQD
17	SPR NG F NGER
18	VANE ASSY
19	VALVE ASSY
20	SPACER ROLLED SPL T 6 REQD
21	NUT ELAST C STOP

SPARE PARTS KIT NO 258153 1 (3 TO 15 PSIG RANGE)

SPARE PARTS K T NO 258154 1 (3 TO 27 PSIG RANGE)

ITEM	NAME	QUANTITY
22	REGULA OR	1
*23	POLYURATHANE TUB NG 34)	1
*24	COMPRESS ON CL PS	6
*25	190 32 STN STL HEX NUT	1
*26	1210-00 STL LKWASHER	1

*NOT LL JSTRATED

NOTE THE PRESSURE REGULATOR ASSEMBLY PART NO 5327770 (1) WHEN NEEDED AS A REP ACEMENT OR SPARE PART M ST BE ORDERED AS PART OF SPARE PARTS K T 258153 1 (3 TO 15 PS G/20 7 TO 103 kPa) OR SPARE PARTS K T 258154 1 (3 TO 27 PS G/20 7 TO 186 kPa PARTS NCLUDED N THESE K TS ARE L STED

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

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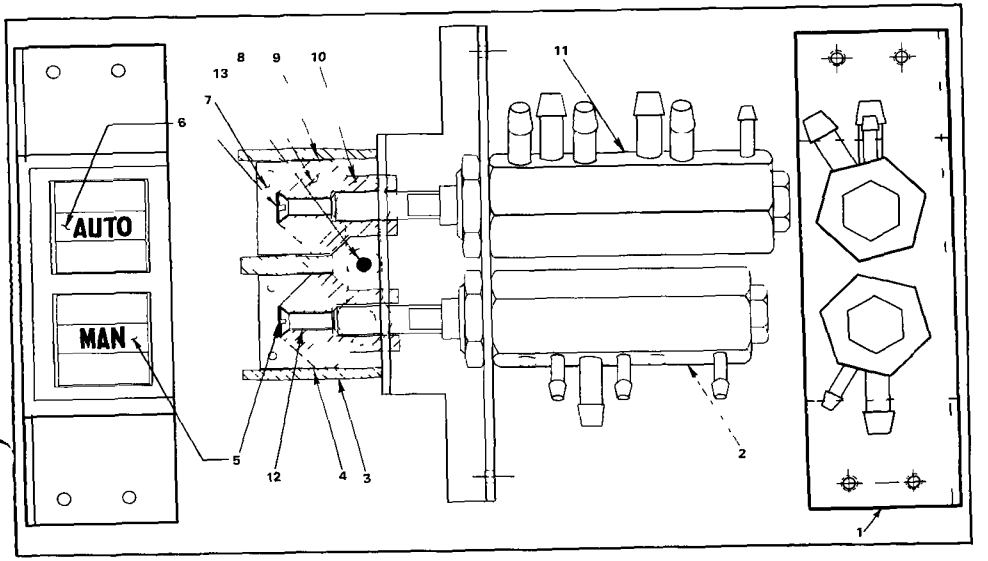
Bailey Meter Company U S A

Bailey Control Systems

Parts Drawing
P91-9-4

TRANSFER VALVE SPARE PARTS KIT NO. 258158-1



ITEM	PART NO	NAME
1	5327068 1	PNEUMAT C SW TCH BRACKET
2	5327069 1	4 WAY SW TCH
3	K T NO 258158 1	PUSHBUTTON HOUS NG
4	K T NO 258158 1	COLOR CH P YEL 2 REQD
5	K T NO 258158 1	PUSHBUTTON NAME PLATE
6	K T NO 258158 1	PUSHBUTTON NAME PLATE
7	K T NO 258158 1	LENS 2 REQD
8	K T NO 258158 1	PUSHBUTTON 2 REQD
9	K T NO 258158 1	COLOR CH PS (GREEN 2 REQD
10	K T NO 258158 1	PUSHBUTTON ROCKER 2 REQD
11	5327094 1	2 & 3 WAY VALVE
12	K T NO 258158 1	112-40x 625 LG FLAT HD STN STL MACH SCR 2 REQD
13	K T NO 258158 1	093x1 LG STN STL ROLL P N

SPARE PARTS KIT NO 258158 1

ITEM	NAME	QUANT TY
3	PUSHBUTTON HOUS NG	1
4	COLOR CHIP (YEL 2 REQD	2
5	PUSHBUTTON NAME PLATE	1
6	PUSHBUTTON NAME PLATE	1
7	LENS	2
8	PUSHBUTTON	2
9	COLOR CH P (GREEN)	2
10	PUSHBUTTON ROCKER	2
12	112-40x 625 LG FLAT HD STN STL MACH SER	2
13	093x1 LG STN STL ROLL P N	1

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 PARTS NCLUDED N K T NO 258158 1 ARE L STED

SPECIFY ALL INFORMATION ON NAMEPLATE WHEN ORDERING

Babcock & Wilcox
Bailey Meter Company U S A