BETTIS®

Multiport Flow Selector

EMERSON™
Process Management

EMERSON. CONSIDER IT SOLVED.™

DESCRIPTION

The Bettis Multiport Flow Selector provides a cost effective method for selecting and diverting well fluids from an individual well to a single test outlet or loop. Connecting up to eight flow lines, the Multiport Flow Selector allows the combined well fluids to flow through a separate group outlet, while simultaneously isolating any single well for testing. The unique flow selector is ideal for operation in a variety of oil and gas or process applications.

FEATURES

- Reduced operating and maintenance costs
- Can be operated manually or electrically
- Compact manifold with reduced size and weight
- Electric operators can be supplied with either AC or DC motors and mechanical limit switches or the popular Bettis Multiport Electronic Controller (MEC)
- Manufactured in accordance with ASME B16.34
- Field adjustable seal, with stainless steel scraper for extended service life
- Fire tested to API 6FA
- Especially suited for use with Multiphase meters

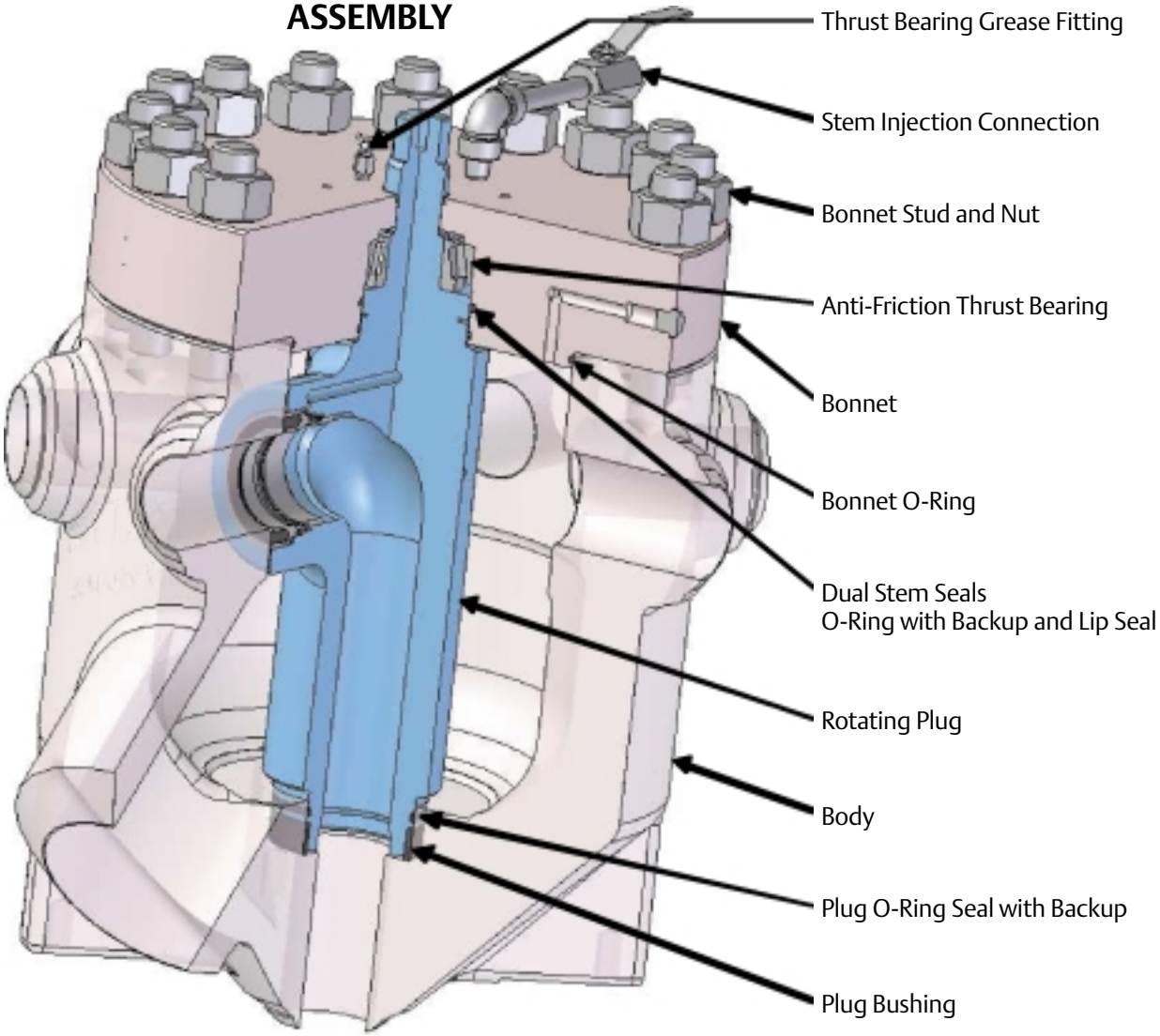
SPECIFICATIONS

- Body and bolting material — See page 7
- Seal material — See page 7
- Motor — 1/4 HP–1/3 HP, 115/230 VAC-24VDC, 1725 RPM, TEFC
- Gear reducer — double reduction worm, oil bath, 1200:1; 1.4 RPM plug rotation
- Plug position accuracy ± 2° or less
- Bettis Switchpak model SW28D-BCT — CSA, CL. I, DIV 1, GR. C AND D, LR 59482 and EExd IIB T6 Category 2 (Pending)
- Push Button Station (optional)
- Multiport Electronic Controller (MEC) — optional
- Digital Display Station (optional)

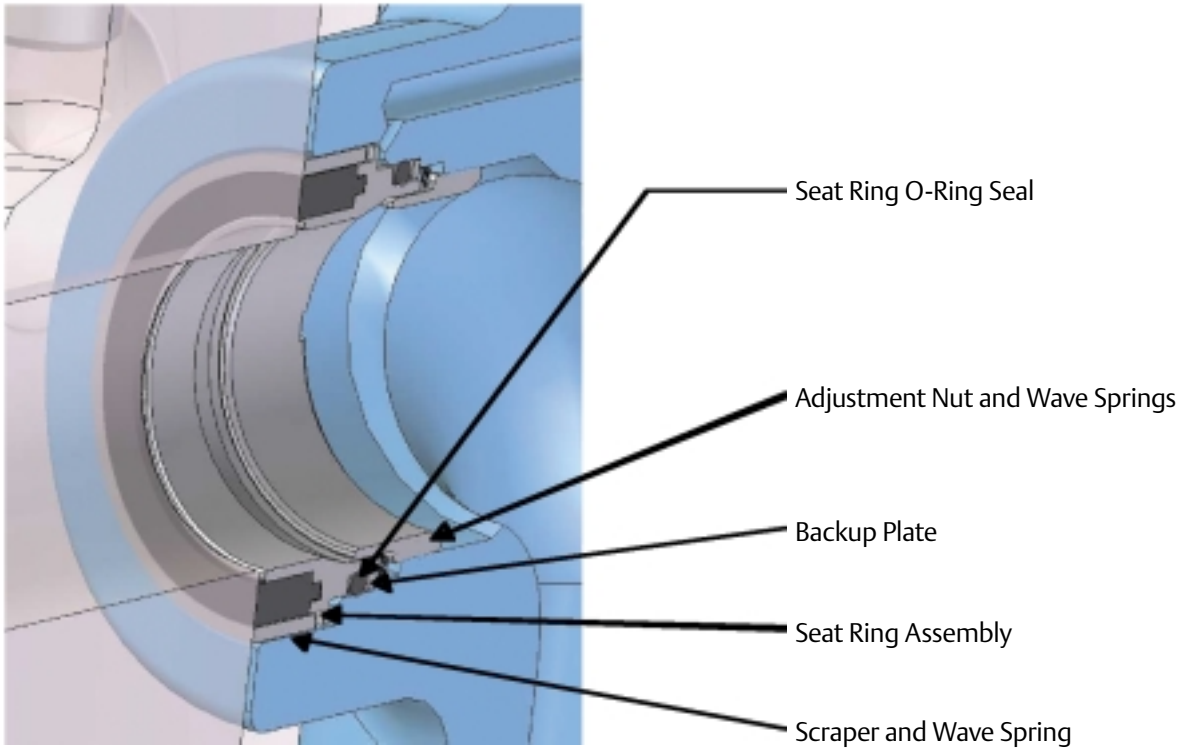
OPTIONS

- Various sizes and ratings of line flanges available
- Sour service trim
- Various internal coatings and overlays available for enhanced abrasion and corrosion resistance, eg: Nickel Plate, Inconel, Stellite, Impreglon
- Various seal material combinations available for adverse service conditions
- Available with third party certification, such as DNV, either job specific or type approval

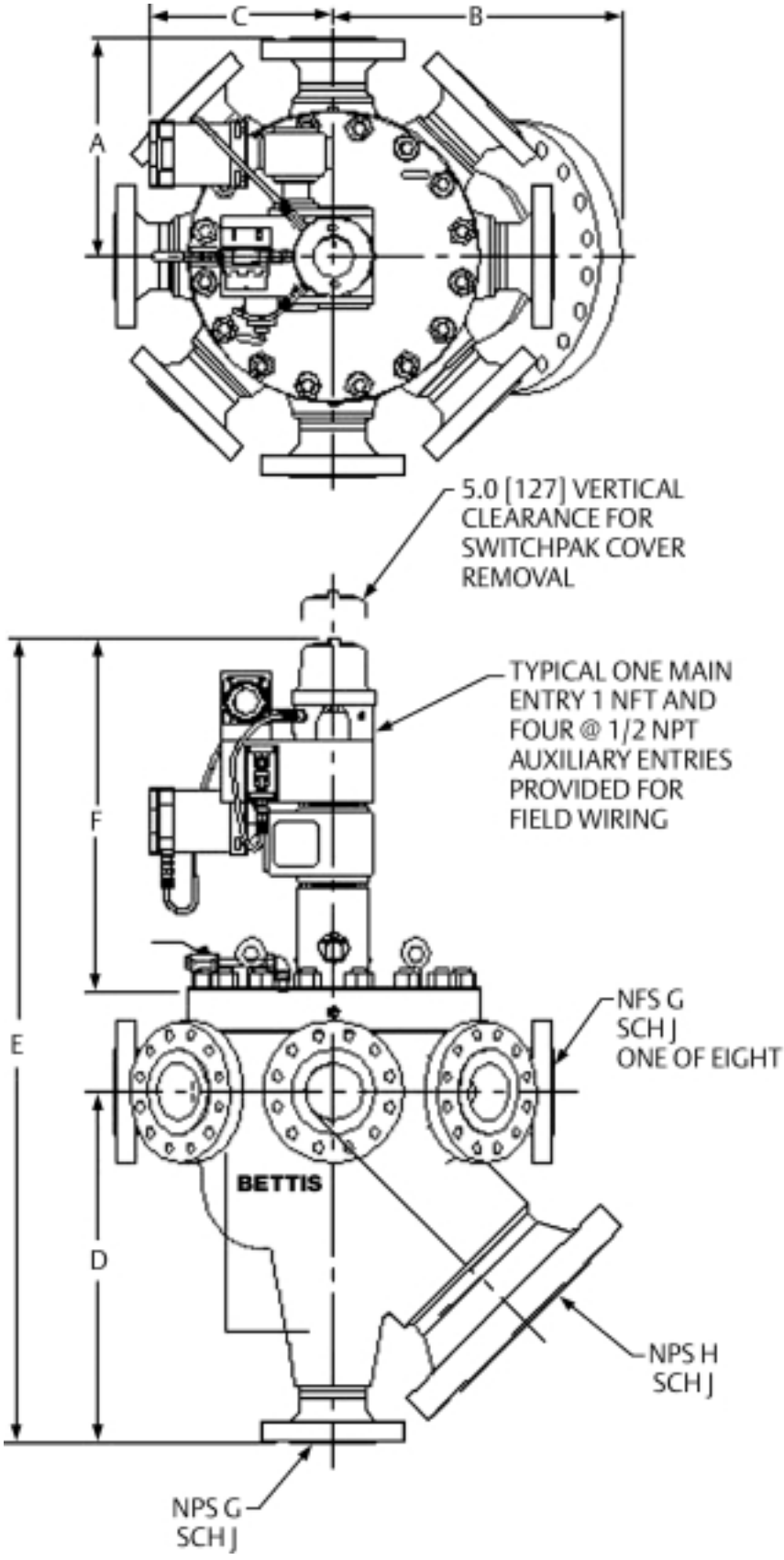
ASSEMBLY



SEAT DESIGN



MULTIPORT FLOW SELECTOR TYPICAL OUTLINE DIMENSIONS

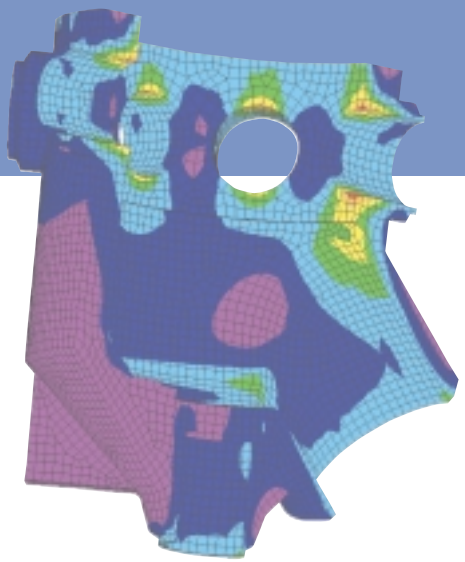


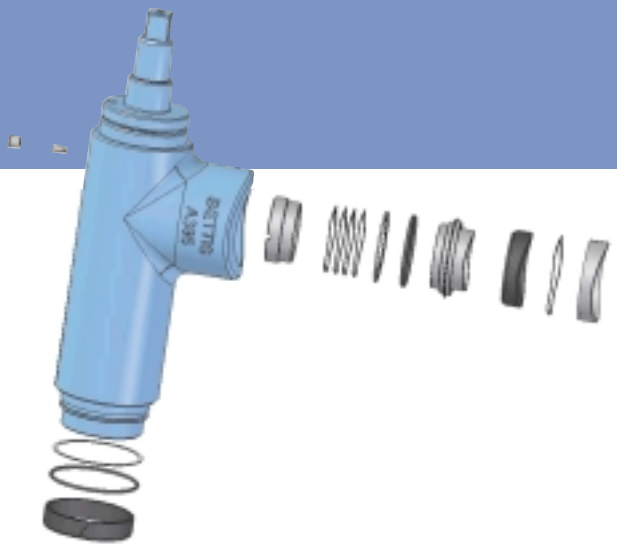
MULTIPORT FLOW SELECTOR TYPICAL DIMENSIONAL DATA

SIZE & ASME CLASS	DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "E"	DIM "F"	NPS "G" RFWN FLANGE	NPS "H" RFWN FLANGE	PIPE SCH "J"	APPROX. WEIGHT
	INCH [MM]	INCH [MM]	INCH [MM]	INCH [MM]	INCH [MM]	INCH [MM]				LB [KG]
2x4 150	13.9 [353]	13.2 [335]	15.8 [401]	16.4 [417]	44.7 [1135]	24.3 [617]	2	4	80	425 [193]
2x4 300	13.9 [353]	13.6 [345]	15.8 [401]	16.4 [417]	44.7 [1135]	24.3 [617]	2	4	80	465 [211]
2x4 600	13.9 [353]	14.1 [358]	15.8 [401]	16.4 [417]	44.7 [1135]	24.3 [617]	2	4	80	475 [216]
2x4 900	13.9 [353]	15.2 [386]	15.8 [401]	16.4 [417]	44.7 [1135]	24.3 [617]	2	4	80	495 [225]
3x6 150	13.4 [340]	14.9 [378]	18.6 [472]	17.2 [437]	53.4 [1356]	30.1 [765]	3	6	80	1025 [466]
3x6 300	13.8 [351]	15.7 [399]	18.6 [472]	17.5 [445]	53.8 [1367]	30.1 [765]	3	6	80	1085 [493]
3x6 600	14.3 [363]	16.8 [427]	18.6 [472]	17.9 [455]	54.2 [1377]	30.1 [765]	3	6	80	1215 [552]
3x6 900	15.2 [386]	17.8 [452]	18.6 [472]	18.8 [478]	55.1 [1400]	30.1 [765]	3	6	80	1335 [607]
3x6 1500	17.0 [432]	19.6 [498]	18.6 [472]	21.0 [533]	59.5 [1511]	30.1 [765]	3	6	160	2135 [970]
4x8 150	15.2 [386]	17.4 [442]	18.6 [472]	21.6 [549]	59.4 [1509]	30.1 [765]	4	8	80	1715 [780]
4x8 300	15.6 [396]	19.3 [490]	18.6 [472]	22.0 [559]	59.8 [1519]	30.1 [765]	4	8	80	1835 [834]
4x8 600	16.4 [417]	20.4 [518]	18.6 [472]	22.9 [582]	60.6 [1539]	30.1 [765]	4	8	80	2045 [930]
4x8 900	16.9 [429]	21.9 [556]	18.6 [472]	23.4 [594]	61.1 [1552]	30.1 [765]	4	8	80	2195 [998]
4x10 900	18.4 [467]	25.6 [650]	19.6 [498]	25.6 [650]	70.4 [1788]	34.6 [879]	4	10	160	3005 [1366]
4x10 1500	18.8 [478]	28.1 [714]	19.6 [498]	26.0 [660]	70.8 [1798]	34.6 [879]	4	10	160	3285 [1493]
6x16 150	20.3 [516]	27.7 [704]	19.6 [498]	33.4 [848]	77.9 [1979]	34.6 [879]	6	16	80	3475 [1580]
6x16 300	20.7 [526]	28.9 [734]	19.6 [498]	33.8 [859]	78.3 [1989]	34.6 [879]	6	16	80	3745 [1703]
6x16 600	21.7 [551]	30.5 [775]	19.6 [498]	34.8 [884]	79.3 [2014]	34.6 [879]	6	16	80	4135 [1880]

NOTE:

1) WEIGHTS LISTED ARE FOR ASSEMBLIES INCLUDING ELECTRIC ACTUATOR AND RFWN FLANGES
2) THREADED OR BEVELED END CONNECTIONS ARE AVAILABLE





MULTIPORT FLOW SELECTOR TYPICAL PERFORMANCE DATA

SIZE & ASME CLASS	SHELL PRESSURE RATING AT	MAXIMUM STATIC TEST-TO-GROUP SEAT DIFFERENTIAL RATING AT 100 ºF [38ºC]	MAXIMUM STATIC GROUP-TO-TEST SEAT DIFFERENTIAL RATING AT 100 ºF [38ºC]	MAXIMUM DYNAMIC SEAT DIFFERENTIAL RATING AT 160 ºF [71ºC]	BREAKAWAY TORQUE AT MAXIMUM DYNAMIC SEAT DIFFERENTIAL	TEST OUTLET Cv	GROUP OUTLET Cv
	PSI [BAR]	PSI [BAR]	PSI [BAR]	PSI [BAR]	FT-LB [N-m]		
2x4 150	285 [20]	1200 [80]	900 [60]	600 [40]	125 [170]	67	262
2x4 300	740 [50]	1200 [80]	900 [60]	600 [40]	125 [170]	67	262
2x4 600	1480 [100]	1200 [80]	900 [60]	600 [40]	125 [170]	67	262
2x4 900	2220 [150]	1200 [80]	900 [60]	600 [40]	125 [170]	67	262
3x6 150	285 [20]	1000 [70]	700 [50]	500 [35]	200 [272]	151	594
3x6 300	740 [50]	1000 [70]	700 [50]	500 [35]	200 [272]	151	594
3x6 600	1480 [100]	1000 [70]	700 [50]	500 [35]	200 [272]	151	594
3x6 900	2220 [150]	1000 [70]	700 [50]	500 [35]	200 [272]	151	594
3x6 1500	3705 [250]	1200 [80]	900 [60]	600 [40]	200 [272]	100	429
4x8 150	285 [20]	800 [55]	600 [40]	400 [28]	250 [340]	270	1040
4x8 300	740 [50]	800 [55]	600 [40]	400 [28]	250 [340]	270	1040
4x8 600	1480 [100]	800 [55]	600 [40]	400 [28]	250 [340]	270	1040
4x8 900	2220 [150]	800 [55]	600 [40]	400 [28]	250 [340]	270	1040
4x10 900	2220 [150]	1000 [70]	1000 [70]	700 [50]	400 [544]	217	1292
4x10 1500	3705 [250]	1000 [70]	1000 [70]	700 [50]	400 [544]	217	1292
6x16 150	285 [20]	700 [50]	700 [50]	500 [35]	600 [816]	491	3658
6x16 300	740 [50]	700 [50]	700 [50]	500 [35]	600 [816]	491	3658
6x16 600	1480 [100]	700 [50]	700 [50]	500 [35]	600 [816]	491	3658

NOTE:

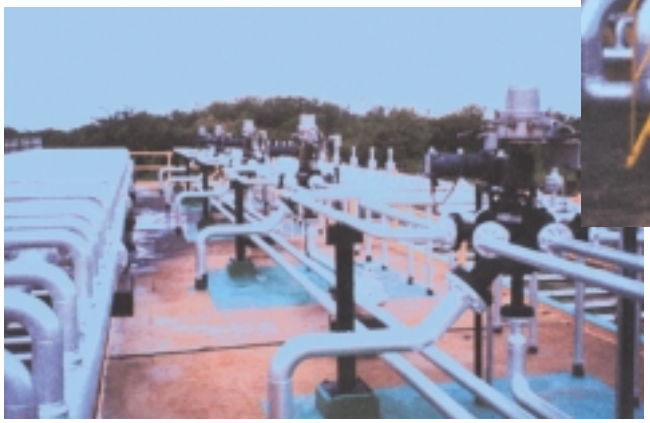
1) STATIC DIFFERENTIAL RATINGS LISTED ARE BASED ON DESIGN LIMIT OF RESILIENT SEAT INSERT
2) DYNAMIC DIFFERENTIAL RATINGS LISTED ARE BASED ON DESIGN LIMIT OF RESILIENT SEAT INSERT AND THE TORQUE RATING OF THE SPEED REDUCER
3) SEAT LEAKAGE PERFORMANCE MEETS CLASS IV ANSI/FCI 70-2 (≤ 0.01% OF TEST OUTLET Cv)
4) BREAKAWAY TORQUES LISTED ARE TYPICAL FOR CLEAN LIQUID HYDROCARBON SERVICE
5) Cv VALUES LISTED BASED ON TESTING PERFORMED TO ISA-S75.02

MULTIPORT FLOW SELECTOR TYPICAL MATERIAL DATA

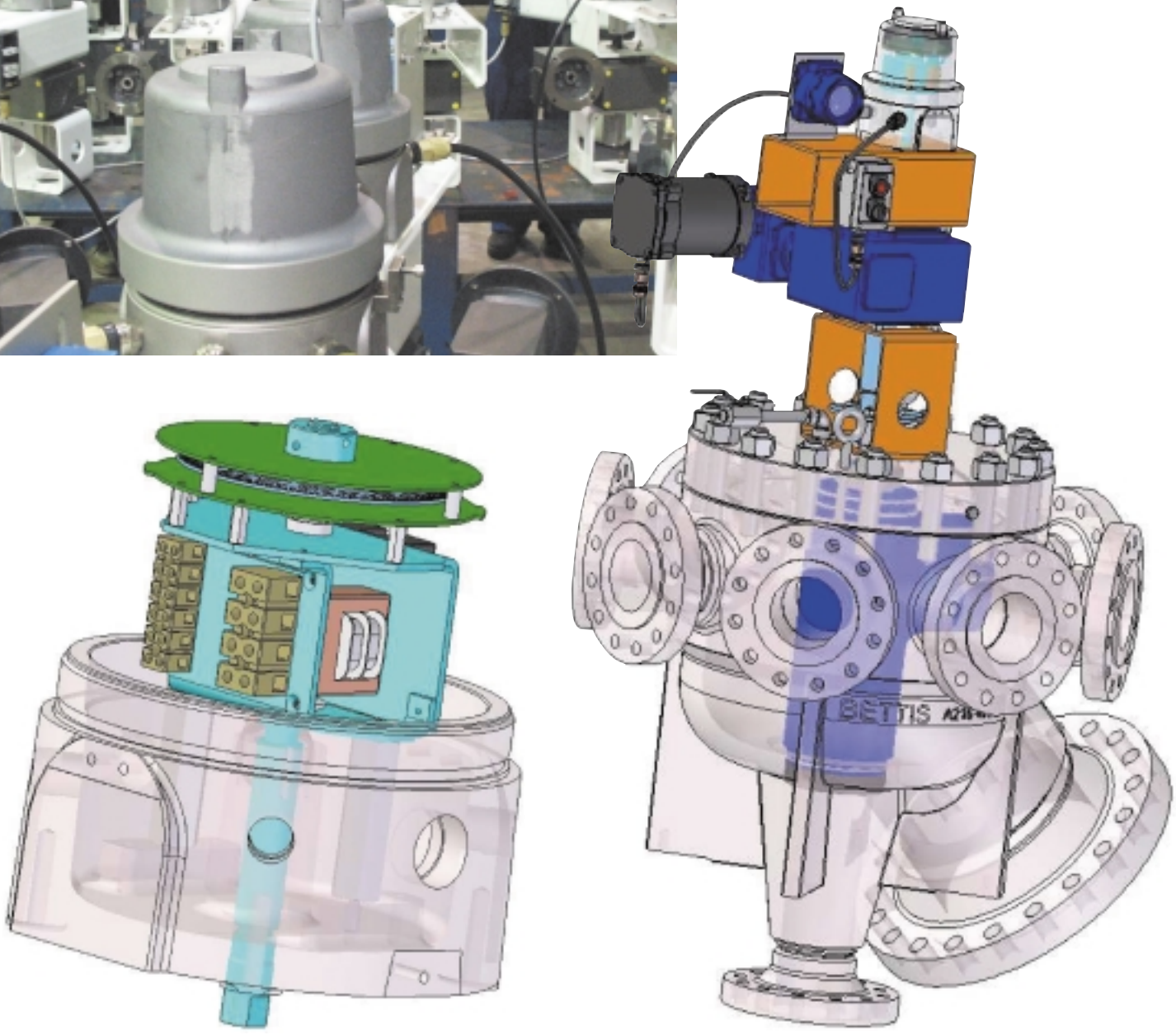
MAJOR COMPONENT DESCRIPTION	STANDARD TRIM	NACE TRIM	LOW TEMPERATURE TRIM	LOW TEMPERATURE NACE TRIM	STAINLESS STEEL TRIM
BODY	A216-WCB	A216-WCB	A351-LCC	A351-LCC	A351-CF3M
LINE FLANGE	A105	A105	A350-LF2	A350-LF2	A351-CF3M
BONNET	A516-70	A516-70	A516-70	A516-70	A351-CF3M
BONNET STUD	A193-B7	A193-B7M	A320-L7	A320-L7M	A320-B8 CL1
BONNET NUT	A194-2H	A194-2HM	A194-L7	A194-L7M	A194-8F
BONNET O-RING	AFLAS	AFLAS	AFLAS	AFLAS	AFLAS
PLUG	A395-65-45-15	A395-65-45-15	A395-65-45-15	A395-65-45-15	A351-CF3M
PLUG O-RING	AFLAS	AFLAS	AFLAS	AFLAS	AFLAS
SEAT RING	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)
SEAT INSERT	PTFE-25% C	PTFE-25% C	PTFE-25% C	PTFE-25% C	PTFE-25% C
SEAT O-RING	AFLAS	AFLAS	AFLAS	AFLAS	AFLAS
BACKUP PLATE	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)
SCRAPER	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)
ADJUSTMENT NUT	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)	T630 (17-4PH)

NOTE:

1) DESIGN AND MATERIALS OF CONSTRUCTION BASED ON ASME B16.34
2) CANADIAN DESIGN REGISTRATION FILE CRN OC1572.2



MULTIPORT ELECTRONIC CONTROLLER – MEC



DESCRIPTION

The Bettis Multiport Electronic Controller (MEC) is a microprocessor-based system designed specifically to control and monitor the status of the Multiport Flow Selector. The MEC contains an absolute optical encoder allowing the monitoring of the rotor position to a fraction of a degree, retaining the memory of the position even without power. The controller card microprocessor analyzes input from the encoder and the host computer to accurately position the valve's rotor.

FEATURES

- The standard system uses a simple ASCII (MP-08) or Modbus RTU (MP-800) format connected via a selectable jumper RS232 or RS485 connection
- Compensates for torque requirement changes for accurate positioning regardless of valve conditions
- Jumpers can disable any valve ports not being utilized
- Less installation wiring requiring when compared to standard electric motor operator
- Pushbuttons can override CPU enabling the re-setting of home port, return to home port and jog
- Can be equipped with optional digital display indicating valve position
- Allows alternate protocols, such as Allen-Bradley, to be readily developed for existing systems
- One physical setting required to position plug at 8 ports, versus 8 independent settings when compared to standard electric motor operator with mechanical limit switches

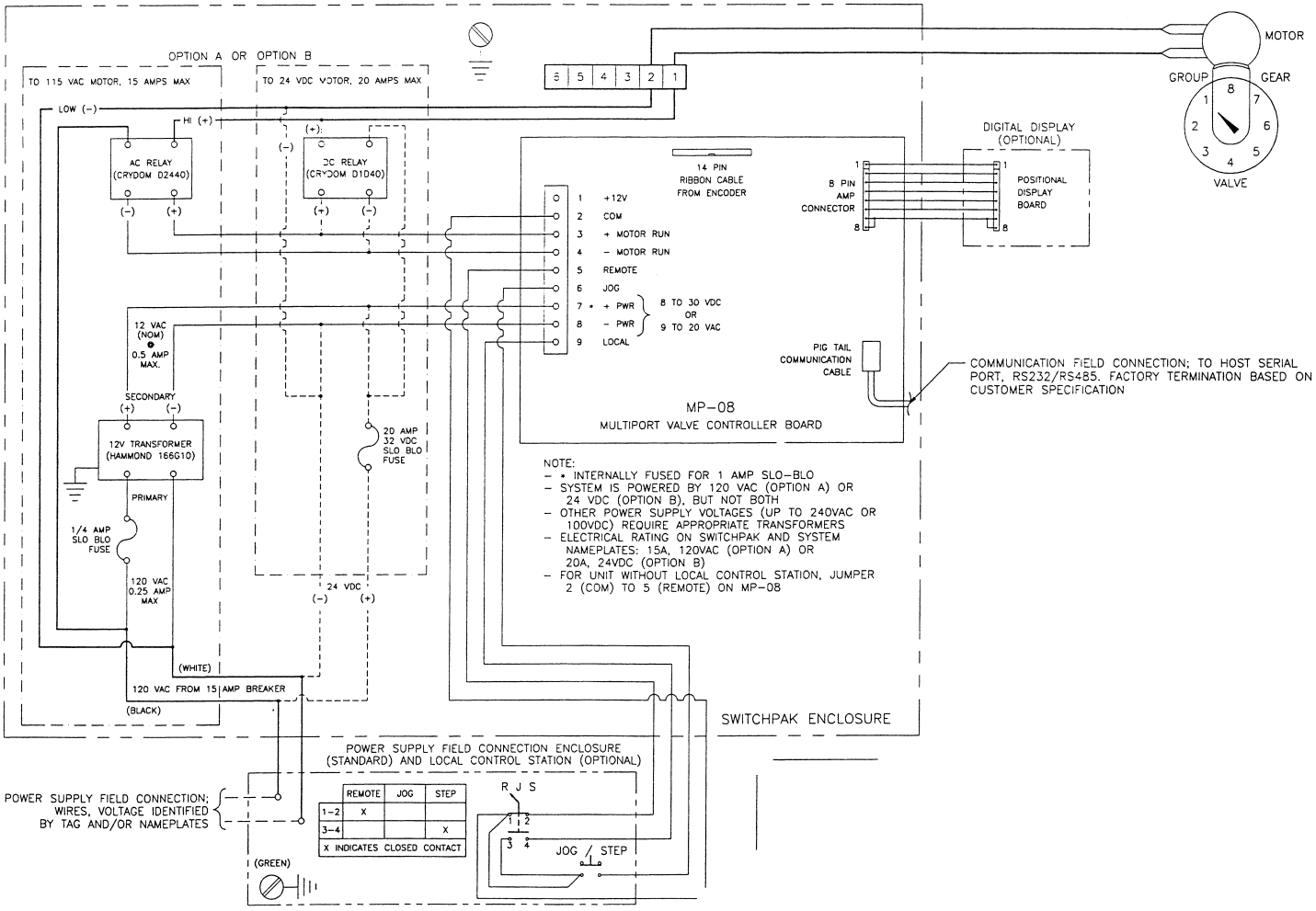
Commands

- "Remote" or "Local" modes of operation.
- "Jog" or "Step" commands are enabled in the "Local" mode and may be used to position the MPFS by on-site personnel
- "Move" command is enabled in the "Remote" mode and is used to remotely position the MPFS to any port
- "Stop" command is enabled in the "Remote" mode and is used to remotely stop the MPFS from moving

Diagnostics

- "Equipment Failure" diagnostic feature detects faulty positioning
- "Go To Homeport Timeout" diagnostic feature detects faulty communication, and in that event positions the MPFS to Home Port
- "Number of Port Changes" diagnostic feature counts the total number of port changes completed, the count may be reset to zero at any time

MEC WIRING DIAGRAM

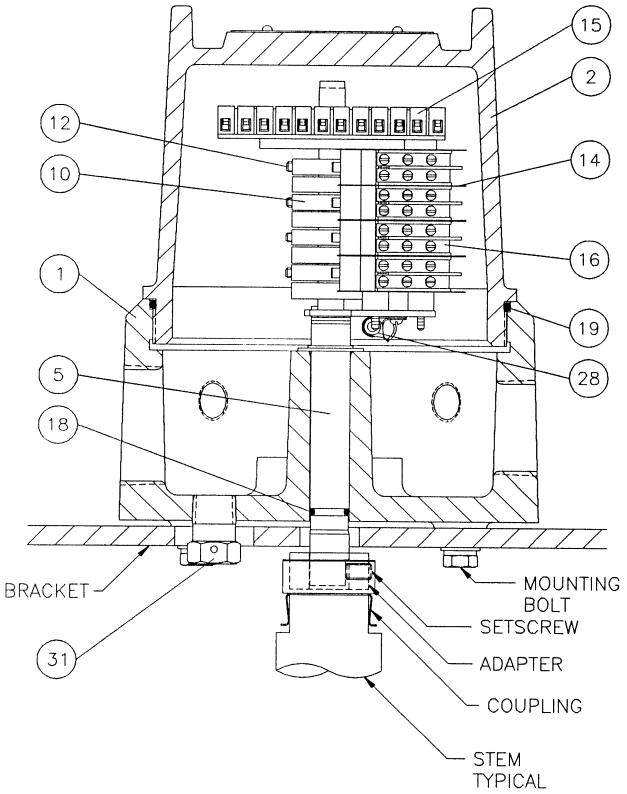


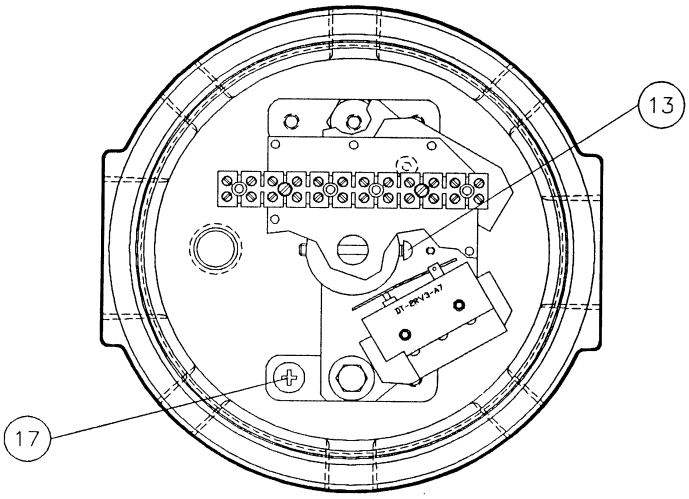
SPECIFICATIONS

Hazardous Location:	Class 1 Div. 1; GR. C & D EEx d IIB T3, IP55	CSA Certified LR 59482 EExd IIB T6, Category 2 (Pending)
Input Voltage Options:	1. 48 – 240 VAC (50 – 60 HZ) 2.6 – 100 VDC	Uses Solid State AC Relay and Transformer Uses Solid State DC Relay and Regulator if Required
Board Voltage:	8 – 30 VDC or 9 – 20 VAC	
Board Current:	0.5 AMPS MAX	
Fuse:	1 AMP Time Delay	
Temperature Rating:	-40°F to +212°F (-40°C to +100°C)	
Board:	Conformally Coated Lightning Protected	
Protocol:	ASCII, Modbus RTU	Windows Based Software Supplied
Communications:	9600 BAUD, 8-Bits No Parity, 1 Stop Bit	

SW2 SWITCHPAK – (MECHANICAL TYPE)

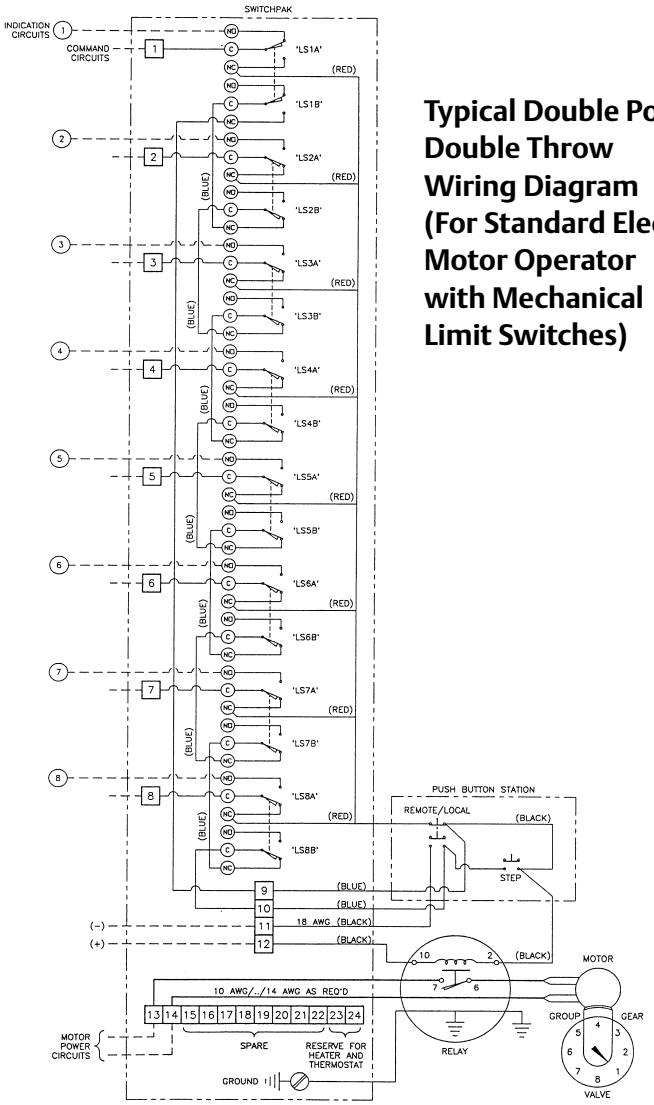
SWITCHPAK ROTARY POSITION INDICATING SWITCH, MODEL SW28D-BCT, IS SUPPLIED WITH 8 SWITCHES, ADJUSTABLE THROUGH 360° OF SHAFT ROTATION. THE ENCLOSURE IS SUITABLE FOR INSTALLATION IN CLASS 1 DIV. 1 GROUP C & D HAZARDOUS LOCATIONS.





ITEM	DESCRIPTION	MATERIAL
1	HOUSING	AL 356.1
2	COVER	AL 356.1
5	SHAFT	SS 316
10	CAM	AL 6061-T6
12	SETSCREW, CAM	SS 304
13	TRIGGER SCREW	NYLON
14	PRESSURE LAMINATE	PHENOL FABRIC
15	TERMINAL BLOCK	MK3/12 MELAMINE
16	MICROSWITCH	DT-2RV3-A7
17	GROUND SCREW	SS 304
18	0-RING SHAFT	NITRILE
19	O-RING, HOUSING	NITRILE
28	HEATER	CERAMIC
31	DRAIN	SS 304

NOTES:
1. SHOWN WITH PLUG AT PORT NO. 1 REMOTE MODE
2. 'LS1_' FOR PORT NO. 1 ARE ACTUATED
3. COMMAND AND INDICATION CIRCUITS MUST BE THE SAME VOLTAGE
4. FOR CCW ROTATION OF PLUG, POSITIVE '+' VOLTAGE MUST BE CONNECTED TO TERMINAL #13
5. ENERGIZE COMMAND CIRCUIT NO. 2 TO MOVE TO PORT NO. 2
6. TO ENGAGE STEPPING COMMAND:
   – SWITCH TO LOCAL MODE
   – PRESS AND HOLD (APPROX. 5 SEC OR UNTIL PLUG POINTER TRAVEL 75% TOWARDS NEXT PORT) STEPPING SWITCH MOMENTARILY, THEN RELEASE



Typical Double Pole Double Throw Wiring Diagram (For Standard Electric Motor Operator with Mechanical Limit Switches)

ORDERING GUIDE – Multiport Flow Selector Specification Sheet

CUSTOMER _____ SPEC. _____ DATE _____
PROJECT _____
LOCATION _____ PROVINCE/STATE _____
QUANTITY _____ TAG _____

OPERATING CONDITIONS

MEDIA: _____ TEMP: MIN _____ ☐ NORM. _____ MAX. _____ ☐
PRESSURE: MIN. (psig) MAX. (psig) △P MAX. (psi)
INLET PORT _____ _____ GROUP TO TEST _____ ☐
TEST PORT _____ _____ TEST TO GROUP _____ ☐
GROUP PORT _____ _____ OTHER _____ ☐

FLOW SELECTOR SPECIFICATION AND MATERIALS

SIZE _____ ☐ ANSI _____ ☐ SWEET _____ ☐ SOUR _____ ☐
BODY _____ ☐ PLUG _____ ☐ PLTG. _____ ☐ SCRAPER _____ ☐
O-RING/BU _____ ☐ STEM WIPER _____ ☐ PLUG SEAT _____ ☐

CONNECTIONS:	SIZE	TYPE	RATING	MAT.
INLET	☐	☐	☐	☐
TEST	☐	☐	☐	☐
GROUP	☐	☐	☐	☐
OTHER				☐

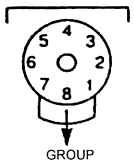
(Specify Insp. Port No. and size if required)

PAINT STD. _____ ☐ ELECTRONIC (MEC) _____ ☐

OPERATOR SPECIFICATIONS

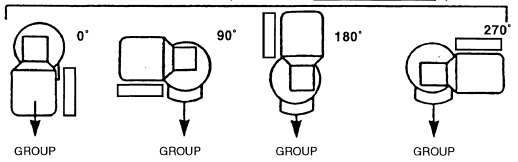
MANUAL LEVERLOK _____ ☐ ELECTRIC _____ ☐ ELECTRONIC (MEC) _____ ☐

STANDARD PORT ORIENTATION



PLUG ROTATION CCW UNLESS OTHERWISE SPECIFIED.

MOTOR ORIENTATION (SPECIFY _____ °)



☐ CONTROL LOCATION

MOTOR VOLTAGE/PHASE _____ ☐ HP _____ ☐ CLASSIF. _____ ☐
CONTROL VOLTAGE _____ ☐ RELAY/VOLTAGE _____ ☐ JCT. BOX _____ ☐
SWITCHPAK MODEL _____ ☐ No./TYPE SWITCHES _____ ☐
HEATER/THERM. _____ ☐ MAN/AUTO STA. _____ ☐
WIRING SCHEMATIC # _____

NOTES _____ ☐
_____ ☐
_____ ☐
CHECK BOX ☐ FOR QC USE ONLY. INSPECTED BY-DATE: ☐

REV. SYMBOL-BY-DATE:
_____
_____
_____

ISO 9001

Quality Certification Bureau Inc.

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Important: Due to Emerson's continuing commitment to engineered product advancement, data presented herein is subject to change.

Bettis Bulletin # 72.00 Rev: 11/04. 2M/12-04