Prindle

01730-B. EQUIPMENT RECORD FORM:

EQUIP DESCRIP 10MSX19AW-M125-6-460-EX		EQUIP LOC CHEHALIS-PRINDLE WWPS	
EQUIP NO. PRI-P-01/02/03	SHOP DWG NO. C0000006	DATE INST	COST
MFGR FLOWSERVE PUMP		MFGR CONTACT TOM ARVIN	
MFGR ADDRESS 5310 TANEYTOWN PIKE, TANEYTOWN, MD 21787			PHONE 410-756-2602
VENDOR APSCO, INC		VENDOR CONTACT ROGER PERRIN	
VENDOR ADDRESS 935 KIRKLAND AVE, KIRKLAND, WA 98083			PHONE 725-822-3335

MAINTENANCE REQUIREMENTS	D	W	M	Q	S	A	Hours
INSPECT POWER CABLES					✓		
INSPECT BARRIER FLUID LEVEL & CLARITY					✓		
INSPECT COOLING FLUID LEVEL & CLARITY					✓		

LUBRICANTS: RECOMMENDED: GREASE: EXXON INFINITEC EP2 (BEARINGS SEALED FOR LIFE)

BARRIER FLUID: ROYAL PURPLE GT22

COOLING FLUID: DOWFROST HD (30% PROPYLENE GLYCOL/70% WATER)

RECOMMENDED SPARE PARTS			
PART NO.	QUAN.	PART NAME	COST
88387206	1	O-RING KIT	REFER
87182598	1	UPPER MECHANICAL SEAL	REFER
89162390	1	LOWER MECHANICAL SEAL	REFER
89162143	1	UPPER BEARINGS	REFER
89162119	1	LOWER BEARINGS	REFER

ELECTRICAL NAMEPLATE DATA			
EQUIP 10MSX19AW-M125-6-460-EX			
MAKE FLOWSERVE PUMP			
SERIAL NO. 05M00241/3		ID NO. -	
MODEL NO. -		FRAME NO. 37	
HP 125	V 460	AMP 151	HZ 60
PH 3	RPM 1160	SF 1.15	DUTY -
CODE F	INSL. CL H	DES B	TYPE SUB.
NEMA DES	C AMB 40	TEMP RISE 90	RATING -
MISC. 3700 USGPM - 91 FT TDH			
MECHANICAL NAMEPLATE DATA			
EQUIP			
MAKE			
SERIAL NO.		ID NO.	
MODEL NO.		FRAME NO.	
HP	RPM	CAP	SIZE
TDH	IMP SZ	BELT NO.	CFM
PSI	ASSY NO.	CASE NO.	
MISC			

MSX PRODUCT NOMENCLATURE

When the pump/motor combination is furnished for a wet-well application on a guide rail system, the model shall be defined as MSX with a "W" designation following the impeller type. Dry pit models with a suction elbow shall be labeled with a "D" designation and transportable models with a pedestal stand shall be labeled with a "T" designation. Additional nomenclature options for the pump and motor are listed below.

HYDRAULIC DESCRIPTION

10MSX19AW

10 = Discharge Diameter
M = Solids Handling Designation
SX = Submersible
19 = Nominal Impeller Diameter
A = Impeller Type
W = Wet-Pit

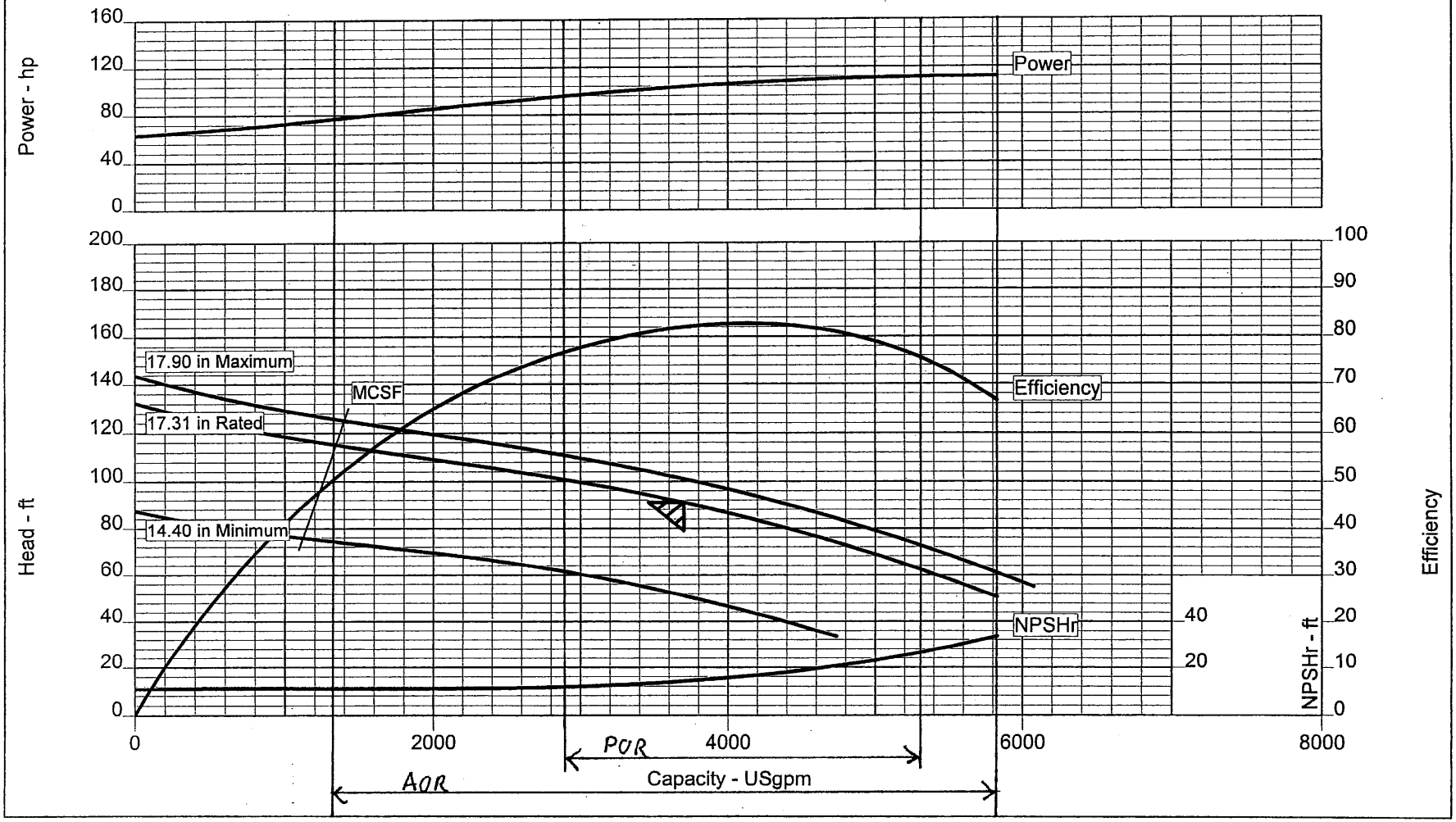
MOTOR DESCRIPTION

M125-6-460-EX

M = Motor
125 = Motor Horsepower
6 = # of Poles
460 = Voltage
EX = Explosion Proof

Customer	: Stellar J			Pump size & type	: 10MSX19A
Item number	: S003670	FLOWSERVE Pump Division		Based on curve no.	: 89123442A
Service	:			Number of stages	: 1
Vendor reference	: 3038-50004	Capacity	: 3700.0 USgpm	Specific gravity	: 1.000
Date	: July 8, 2005	Head	: 91.00 ft	Pump speed	: 1160 rpm

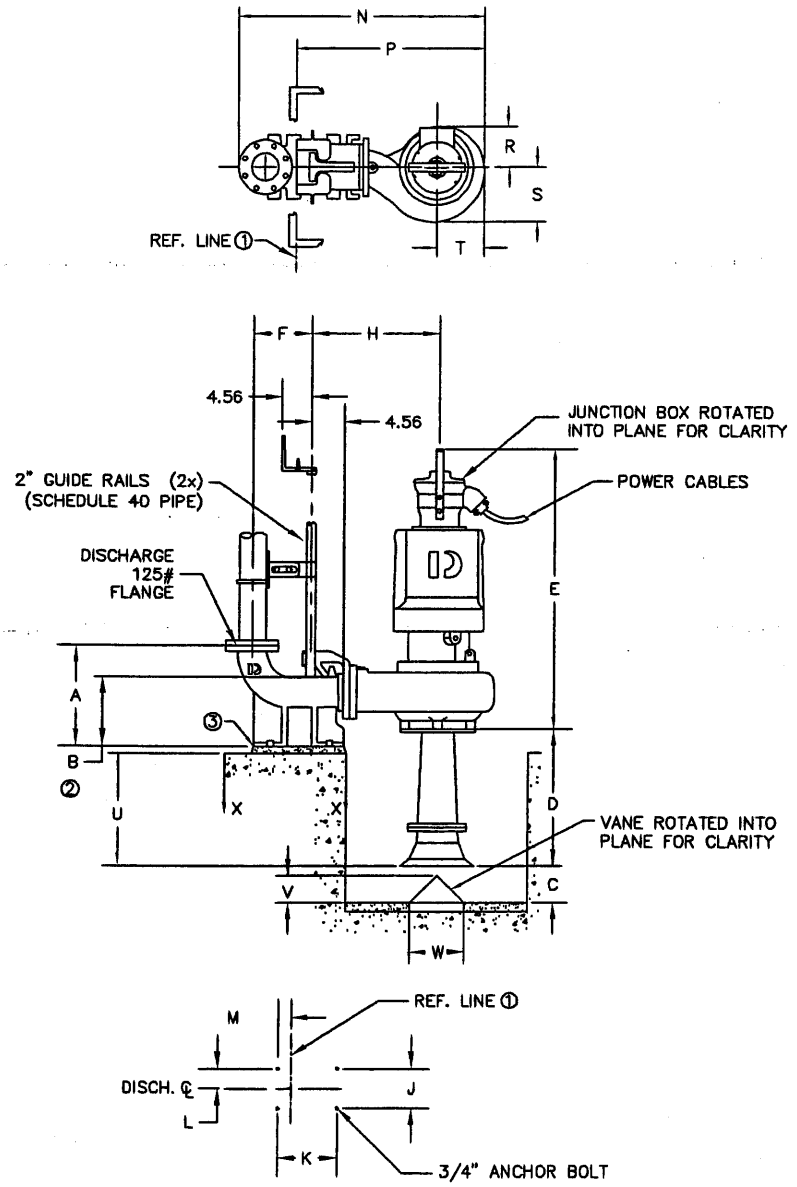
CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS, CAPACITY, HEAD, AND EFFICIENCY.



WinPROS+ V3.2.0

GENERAL ARRANGEMENT
SERIES 3 – WET PIT
10MSX19 – DOUBLE GUIDE RAIL

PRI–P–01
PRI–P–02



SECTION X–X

NOTES:
① REF. LINE INDICATES INSIDE EDGE OF ACCESS FRAME.
② DIMENSION TO ENDS OF GUIDE RAILS.
③ 1 5/8" OF GROUT

ALL DIMENSIONS IN INCHES

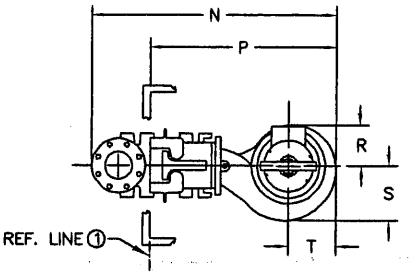
DIMENSIONS ARE FROM DRAWINGS, CASTINGS MAY VARY SLIGHTLY. FOUNDATION BOLTS MUST NOT BE FIXED RIGIDLY UNTIL MACHINE IS IN PLACE. EXPANSION JOINTS USED IN THE DISCHARGE AND/OR SUCTION PIPING SHALL HAVE SUITABLY SIZED TIE RODS TO PREVENT THE TRANSMISSION OF EXCESSIVE HYDRAULIC FORCES TO THE PUMP. THIS PRINT IS LOANED SUBJECT TO RETURN ON DEMAND AND UNDER CONDITION THAT IT IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO OUR INTERESTS. DO NOT SCALE; ADDITIONAL DIMENSIONS WILL BE FURNISHED UPON REQUEST.

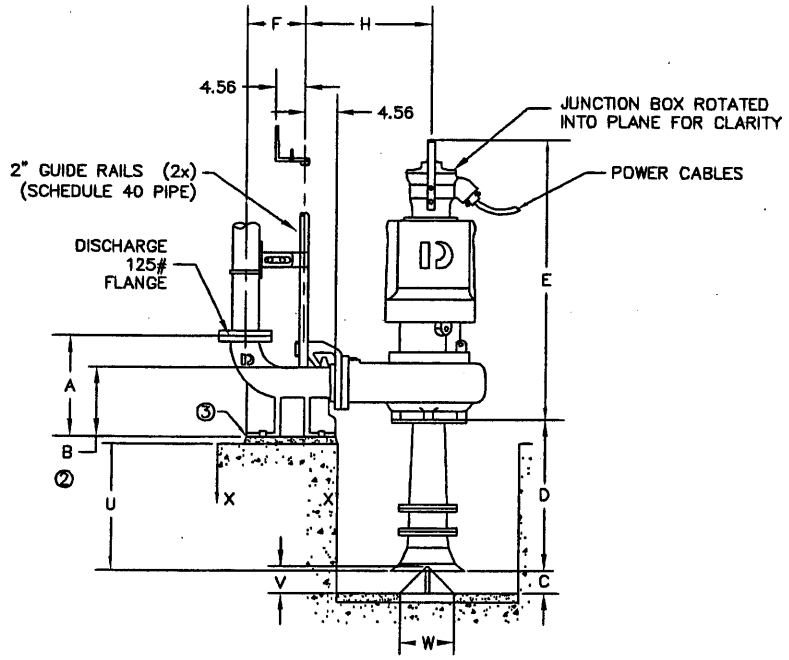
	FRAME	H.P.	POLE	PH. / CYCLE / VOLTS
DRIVER	37	125	6	3 / 60 / 460

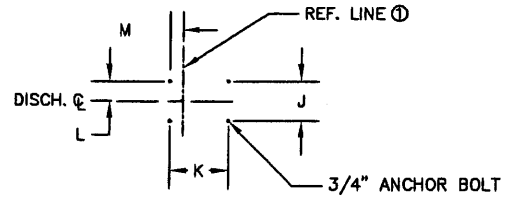
PUMP	MOTOR FRAME	DISCH. SIZE	DIMENSIONS																			PUMP WEIGHT (LBS)	BASE WEIGHT (LBS)
			A	B	C	D	E	F	H	J	K	L	M	N	P	R	S	T	U	V	W		
10MSX19	37	~~10~~	~~23.13~~	~~20.25~~	~~12.50~~	~~31.00~~	~~84.62~~	~~14.19~~	~~32.70~~	~~9.50~~	~~19.69~~	~~4.75~~	~~9.57~~	~~69.61~~	~~51.98~~	~~13.03~~	~~16.24~~	~~14.72~~	~~23.25~~	~~9.38~~	~~18.75~~	~~5836~~	~~266~~
		12	25.81	20.25	12.50	31.00	84.62	17.07	32.70	20.75	20.75	10.38	10.63	73.99	51.98	13.03	16.24	14.72	23.25	9.38	18.75	5836	397

GENERAL ARRANGEMENT
SERIES 3 – WET PIT
10MSX19 – DOUBLE GUIDE RAIL

PRI–P–03







SECTION X–X

NOTES:
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② DIMENSION TO ENDS OF GUIDE RAILS.
③ 1 5/8" OF GROUT

ALL DIMENSIONS IN INCHES

DIMENSIONS ARE FROM DRAWINGS, CASTINGS MAY VARY SLIGHTLY. FOUNDATION BOLTS MUST NOT BE FIXED RIGIDLY UNTIL MACHINE IS IN PLACE. EXPANSION JOINTS USED IN THE DISCHARGE AND/OR SUCTION PIPING SHALL HAVE SUITABLY SIZED TIE RODS TO PREVENT THE TRANSMISSION OF EXCESSIVE HYDRAULIC FORCES TO THE PUMP. THIS PRINT IS LOANED SUBJECT TO RETURN ON DEMAND AND UNDER CONDITION THAT IT IS NOT TO BE USED IN ANY WAY DETRIMENTAL TO OUR INTERESTS. DO NOT SCALE; ADDITIONAL DIMENSIONS WILL BE FURNISHED UPON REQUEST.

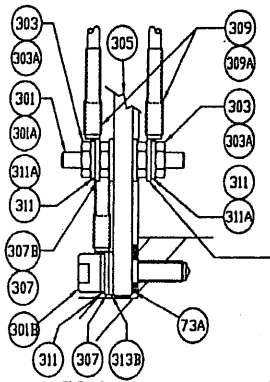
	FRAME	H.P.	POLE	PH. / CYCLE / VOLTS
DRIVER	37	125	6	3 / 60 / 460

PUMP	MOTOR FRAME	DISCH. SIZE	DIMENSIONS																			PUMP WEIGHT (LBS)	BASE WEIGHT (LBS)
			A	B	C	D	E	F	H	J	K	L	M	N	P	R	S	T	U	V	W		
10MSX19	37	~~10~~	~~23.13~~	~~20.25~~	~~6.25~~	~~37.25~~	~~84.62~~	~~14.19~~	~~32.70~~	~~9.50~~	~~19.69~~	~~4.75~~	~~9.57~~	~~69.61~~	~~51.98~~	~~13.03~~	~~16.24~~	~~14.72~~	~~29.50~~	~~9.38~~	~~18.75~~	~~5836~~	~~266~~
		12	25.81	20.25	6.25	37.25	84.62	17.07	32.70	20.75	20.75	10.38	10.63	73.99	51.98	13.03	16.24	14.72	29.50	9.38	18.75	5836	397

FLOWSERVE

SERIES 3 SECTIONAL

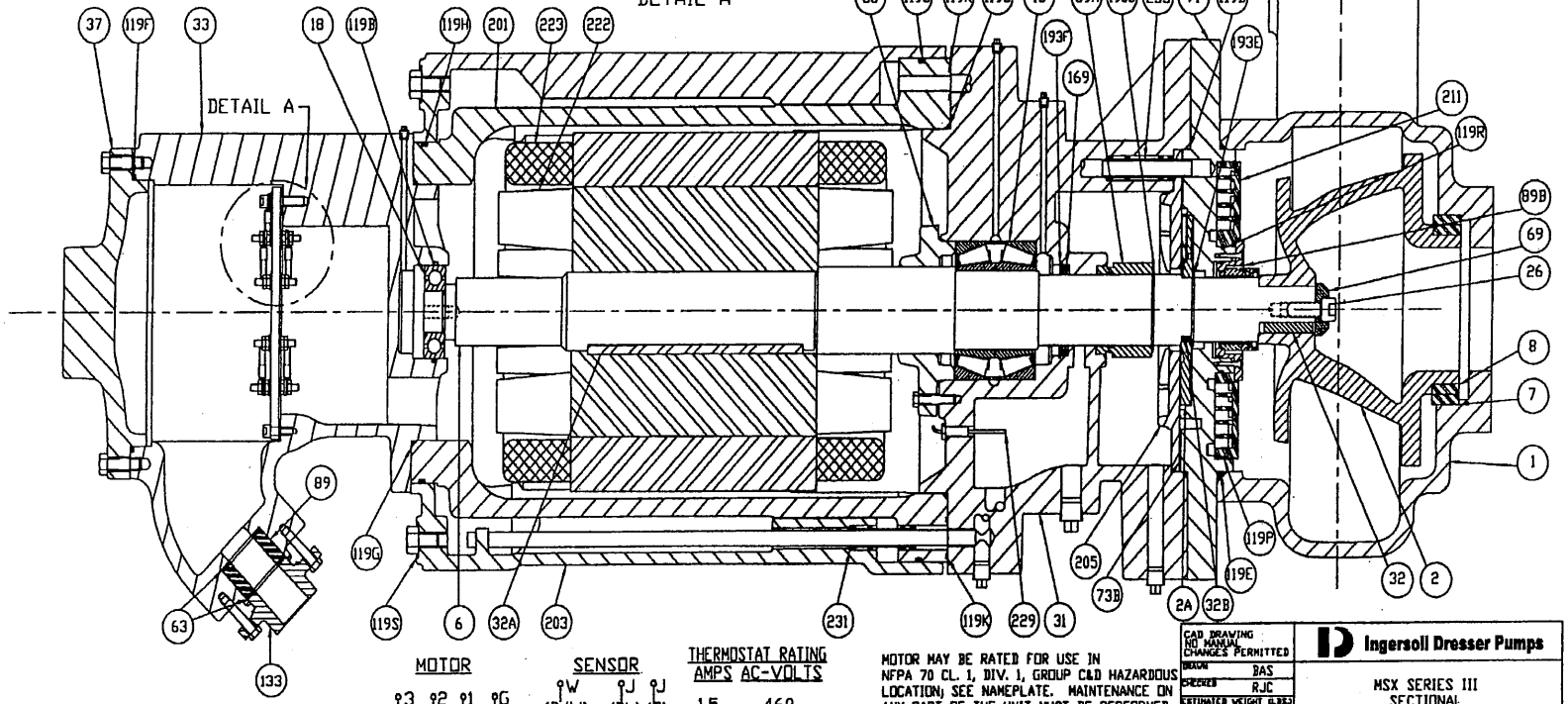
STATIONARY PARTS					
ITEM	QTY.	DESCRIPTION	ITEM	QTY.	DESCRIPTION
1	1	CASING	119G	1	O-RING, JNCT. BOX/STR. HOUS.
7	1	RING, WEARING, CASING	119H	1	O-RING, COOL JCKT., UPPER
31	1	HOUSING, BEARING	119J	1	O-RING, COOL JCKT., LOWER
33	1	BOX, JUNCTION	119K	2	O-RING, STR. HOUS., COOL FLUID
35	1	COVER, BEARING	119P	1	O-RING, HEAT EXCHANGER, OUTER
37	1	COVER, BOX, JUNCTION	119R	1	O-RING, HEAT EXCHANGER, INNER
63	AS REQ'D	WASHER, GLAND	119S	2	O-RING WSHR., COOL FLUID FIL/VNT
71	1	PLATE, ADAPTER	133	AS REQ'D	GLAND, CABLE
73A	1	GASKET, TERMINAL BOARD	169	1	SEAL, BEARING
73B	1	GSKT, CVR PLT./ADPTR. PLT.	193F	1	SNAP RING, SEAL, BEARING
89	AS REQ'D	BUSHING, CABLE	201	1	HOUSING, STATOR
89A	1	MECHANICAL SEAL, SECONDARY	203	1	JACKET, COOLING
89B	1	MECHANICAL SEAL, PRIMARY	205	1	COVER, IMPELLER, COOLING FLUID
119B	1	O-RING, LINE BEARING	211	1	HEAT EXCHANGER
119C	1	O-RING, STR. HOUS./BRG. HOUS.	223	1	STATOR
119D	1	O-RING, BRG. HOUS./ADPTR. PLATE	229	1	SENSOR, MOISTURE
119E	1	O-RING, ADPTR. PLT./CASING	231	1	TUBE, RETURN, COOLING FLUID
119F	1	O-RING, COVER, JNCT. BOX	233	1	TUBE, SUPPLY, COOLING FLUID



DETAIL A

TERMINAL BOARD PARTS		
ITEM	QTY.	DESCRIPTION
301	3	POST, TERM., POWER
301A	3	POST, TERM., SENSOR
301B	1	SCREW, TERM., GROUND
303	6	NUT, TERM., POWER
303A	6	NUT, TERM., SENSOR
305	1	BOARD, TERM.
307	AS REQ'D	TERM., RING TONG., POW., CABLE
307A	AS REQ'D	TERM., RING TONG., POW., MTR.
307B	6	TERM., RING TONG., SENSOR
309	AS REQ'D	TUBE, HEAT SHRINK, POWER
309A	6	TUBE, HEAT SHRINK, SENSOR
311	7	WASHER, STAR, POWER
311A	6	WASHER, STAR, SENSOR
313B	1	WASHER, FLAT, GROUND

ROTATING PARTS		
ITEM	QTY.	DESCRIPTION
2	1	IMPELLER
2A	1	IMPELLER, COOLING FLUID
6	1	SHAFT, ROTOR
8	1	RING, WEARING, IMPELLER
16	1	BEARING, THRUST
18	1	BEARING, LINE
26	2	SCREW, IMPELLER
32	1	KEY, IMPELLER
32A	1	KEY, ROTOR
32B	1	KEY, OIL IMPELLER
69	1	WASHER, IMPELLER
193C	1	SNAP RING, MECH. SEAL
193E	1	SNAP RING, OIL IMPELLER
222	1	ROTOR



MOTOR

SENSOR

MOIST. T'STAT SENS. LEADS

THERMOSTAT RATING	
AMPS	AC-VOLTS
1.5	460
1.2	575

USE A MANUAL MOMENTARY START SWITCH ONLY

MOTOR MAY BE RATED FOR USE IN NFPA 70 CL. 1, DIV. 1, GROUP C&D HAZARDOUS LOCATION; SEE NAMEPLATE. MAINTENANCE ON ANY PART OF THE UNIT MUST BE PERFORMED BY AUTHORIZED INGERSOLL DRESSER SERVICE PERSONNEL. MAINTENANCE BY ANY OTHER PERSONNEL WILL NEGATE THE CERTIFICATION AND VOID THE FACTORY WARRANTY.

LATEST	REVISION	AUTH	DRN	EDCN
0	SEE EDC	RJC	RJC	112202
DATE	SYM			

CAD DRAWING NO MANUAL CHANGES PERMITTED

DRAWN BAS

CHECKED RJC

ESTIMATED WEIGHT (LBS) ---

DATE 14DEC99

MATERIAL ---

Ingersoll Dresser Pumps

MSX SERIES III SECTIONAL

DWG. NO. C-0000006

DWG. TYPE SECT

REV. B

SCALE NONE

PAGE 1 OF 1

PUMP MATERIALS OF CONSTRUCTION

COMPONENT	MATERIAL
Pump Casing	Cast Iron, ASTM A48, CL30
Casing Wear Ring	400 Series Stainless Steel, ASTM A276
Impeller	Type 316L Stainless Steel, ASTM A744
Impeller Wear Ring	400 Series Stainless Steel, ASTM A276
Suction Bell	Carbon Steel
Suction Vane or Cross	Type 316L Stainless Steel
Motor Housing	Cast Iron, ASTM A48, CL30
Cooling Jacket	Cast Iron, ASTM A48, CL30
Seal Plate	Cast Iron, ASTM A48, CL30
Bearing Plate	Cast Iron, ASTM A48, CL30
Cable Entry	Cast Iron, ASTM A48, CL30
Hardware	Type 316 Stainless Steel
Shaft	Type 416 Stainless Steel
Upper Mechanical Seal Faces	Silicon Carbide / Silicon Carbide
Lower Mechanical Seal Faces	Silicon Carbide / Silicon Carbide
Upper Bearing	Deep Groove Ball Bearing
Lower Bearings	Tapered Roller Bearings
O-rings	Buna-N
Cable Entry Grommet	Neoprene
Seal Oil	Environmentally Friendly
Power and Control Cable	UL Listed - W
Impeller Key	Type 416 Stainless Steel
Impeller Bolt	Type 316 Stainless Steel

IMPELLER INFORMATION

Number of Vanes: 2
Maximum Solid Size: 4.9”

SHOP COATING

COATING DETAILS:

Interior and exterior of the casing, exterior of the pump, interior and exterior of the discharge base will receive:

-Sherwin Williams Powder Epoxy

COATING DATA SHEETS:

Data sheets for the coatings specified above are provided on the following page.

SHOP COATING CON'T

SHERWIN WILLIAMS® **POWDURA®**

POWDER COATINGS FOR INDUSTRY

EPOXY POWDERS

Providing outstanding chemical resistance and adhesion to wide range of substrates (e.g. template phosphatized steel and glass), Powdura® Epoxy Powders are recommended for functional and decorative applications.

CHARACTERISTICS

Powdura® Epoxy Powders are designed to achieve thin films ranging from 1 – 3 mils. Higher film thickness requirements can be obtained through special techniques and processes.

TYPICAL APPLICATIONS

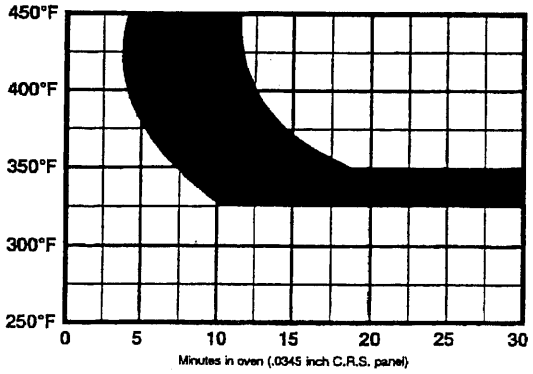
- Steel Furniture
- Refrigeration
- Hospital Equipment
- Underhood Automotive
- Shelving
- Electrical Equipment
- Instrument Casings
- Appliances

STORAGE

Powdura® Epoxy Powder should be kept in a dry and cool area at temperatures below 75°F (24°C). Shelf life ranges from 6 months to over one year. When not in use, store powder in sealed containers: fine powders are hygroscopic.

OVEN CURE TABLE

Cure schedules for Epoxy Powders will follow curve falling within shaded area shown below.



FILM CHARACTERISTICS

Property	Test Method	Result
Adhesion	Cross Hatch ASTM-D3359	Excellent
Hardness	ASTM-D3363	H Plus
Flexibility	ASTM-D1737	180°, 1/4" Conical Mandrel
Specific Gravity	ASTM-D792	1.2 to 2.0
Gloss (60%)	ASTM-D523	2% to 100%
Impact	ASTM-D2794	Up to 160 in lbs.
Salt Spray	ASTM-B117	1000 hrs. +
Humidity	ASTM-D2247	1000 hrs. +

Bonderite 1000® panels were used for all tests performed and electrostatically sprayed at 1.8 – 2.2 D.F.T. (unless otherwise noted).

HANDLING & SAFETY PRECAUTIONS

- The area adjacent to the coating operation should be properly ventilated.
- Cure ovens must be exhausted to the outside atmosphere.
- All dusts are respiratory irritants, inhalation of the dust should be avoided.
- If skin contact occurs, wash thoroughly with soap and water.
- Should eye contact occur, flush with water immediately and procure medical attention.
- To avoid static electricity build-up, properly ground all equipment.
- Provide dust collection equipment with adequate explosion venting; dust clouds of any finely divided organic material can be ignited by open flame or electrical sparks.

CAUTION! Causes eye irritation, causes skin irritation, may cause allergic skin reaction, respiratory irritant, dust may cause eye and respiratory irritation, dust may form explosive mixture in air. Avoid breathing dust. Avoid contact with eyes and prolonged or repeated contact with skin. Use protective clothing and a NIOSH approved respirator. Do not use near sparks or open flame or any type of ignition source. Wash thoroughly after handling. Use only with adequate ventilation.

- DO NOT TAKE INTERNALLY
- KEEP OUT OF THE REACH OF CHILDREN
- FOR INDUSTRIAL USE ONLY
- REFER TO MATERIAL SAFETY DATA SHEET FOR ADDITIONAL INFORMATION

MECHANICAL SEALS

ATT Steve

UPPER SEAL (SECONDARY SEAL)

John Crane Type 8-1
- Shaft Size: 3.75"
- Seal/Seat Matl: Silicon Carbide / Silicon Carbide
- Elastomer: Buna-N
- Metal Parts: 316 Stainless Steel

LOWER SEAL (PRIMARY SEAL)

John Crane Type 5610
- Shaft Size: 3.50"
- Seal/Seat Matl: Silicon Carbide / Silicon Carbide
- Elastomer: Viton
- Metal Parts: 316 Stainless Steel

MSX INDUCTION MOTOR DATA (Rev 1)

Motor Type: M125-6-460-EX

Shaft HP	125
RPM	1160
Voltage	460
No Load Current (amps) Full Load Current (amps)	55.9 151
Locked Rotor Current (amps)	850
NEMA Locked-Rotor Code Letter	F
NEMA Design Letter	B
Service Factor	1.15
Rating-Duty	40C AMB CONT
Line – Line Resistance @ 25 C	.059 Ohms

Load Characteristics at 460 Volts, 60 HZ

% Of Rated Load	Efficiency	Power Factor	Current
115% FL	94.1	82	173.7
100% FL	94.4	82	151.2
75% FL	94.5	79	118.2
50% FL	93.9	70	89.1
25% FL	90.1	49	66.8

Motor - The pump motor shall be an induction type squirrel cage design. The rotor and stator shall operate in an air-filled, watertight housing. The motor shall have a NEMA B design rating with the stator windings and leads having a Class H insulation rating (180 degree C). The motor housing shall be constructed of ASTM A48, Class 30 cast iron. The motor shall be designed for continuous duty, either submerged or unsubmerged while pumping fluids up to 40 degrees C. Motors shall be capable of handling 15 equally spaced starts per hour. All windings shall be rated for inverter duty to reduce damage caused by voltage spikes associated with variable frequency drives. Thermal switches shall be imbedded in each phase of the windings and set to open at 135 degrees C. The thermal switches shall be wired in series and be connected to the motor controls to shut down the pump during a high temperature condition. The combined service factor of the motor shall be a minimum of 1.15. The motor horsepower shall be selected such that the unit is non-overloading over the entire specified performance range. The submersible motor shall be listed by Factory Mutual as explosion proof for service in Class 1, Division 1, Group C and D hazardous locations.

11060-A. MOTOR DATA FORM:

Equipment Name Pumps Equipment No.(s) PRI-P-01/02/03

Site Location Prindle

Nameplate Markings

Mfr Flowserve Mfr Model 10MSX19 Frame 37 HP 60
Volts 460 Phase 3 RPM 1160 Service factor 1.15
FLA 151.0 LRA 850.0 Freq 60 Amb temp rating 40 degrees C
Time rating Continuous (NEMA MG1-10.35) Design letter B (NEMA MG-1.16)
KVA code letter F Insulation class H

The following information is required for explosionproof motors only:

A. Approved by UL for installation in Class 1, Div 1

B. UL frame temperature code T3C; (NEC Tables 500-2 and 500-2(b)) Group C & D Atmosphere

The following information is required for all motors 1/2 horsepower and larger:

A. Guaranteed minimum efficiency 93.6 (paragraph 11060-2.04 G)

B. Nameplate or nominal efficiency 94.4

Data Not Necessarily Marked on Nameplate

Type of enclosure Submersible / Explosion Proof Enclosure material Cast Iron

Temp rise 38 degrees C (NEMA MG1-12.41,42)

Space heater included? ____ Yes X No; if Yes, ____ watts ____ volts

Type of motor winding overtemperature protection, if specified: Klixon

Use the space below to provide additional information on other motor modifications, if specified:

CABLE DATA SHEET

POWER/SENSOR CABLE

CABLE TYPE	CABLE DIAMETER	CABLE LENGTH	QTY.
W	1.025"	100'	2

PURPOSE	COLOR	GAUGE
Power	Red	8
Power	Black	8
Power	White	8
Ground	Green	8
Thermal Switches	Blue	18
Thermal Switches	Orange	18
Moisture Probe	White / Black	18

POWER CABLE

CABLE TYPE	CABLE DIAMETER	CABLE LENGTH	QTY.
W	1.025"	100'	1

PURPOSE	COLOR	GAUGE
Power	Red	8
Power	Black	8
Power	White	8
Ground	Green	8

MODEL MOS-1P

OVER-TEMPERATURE AND SEAL FAILURE DETECTION RELAY

INSTALLATION AND OPERATION INSTRUCTIONS

MADE IN U.S.A.

IMPORTANT

1. Measure the resistance between the probe lead wires - or the single lead and ground - using the highest resistance scale on an ohm meter. If this value (which will usually be infinity indicating an open circuit) is greater than 150K ohms, this is the proper model seal failure detector. If less than 150K ohms, the Model MOS-1PR should be used.

2. The unit should periodically be tested using the following procedure:

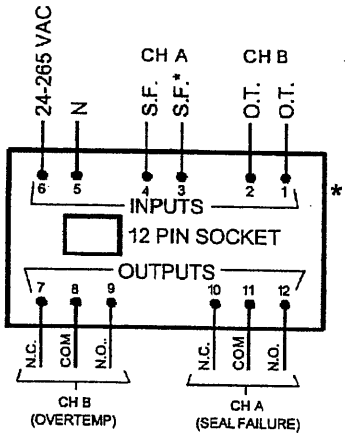
A. Press the Test push button for 5 seconds. When released, both LED's will begin to flash.

B. Press the Reset push-button for 5 seconds. If there is no Over-temperature or Seal Failure condition present, both LED's will extinguish.

Upon the occurrence of the first alarm condition, the proper LED will illuminate a steady alarm indication. If the alarm should clear, the LED will then begin to flash, so that the operator will know that at least one alarm occurrence has been detected, and cleared.

The over-temperature circuit requires a normally closed temperature switch in the motor while the seal failure circuit measures the resistance of oil in the seal chamber using two probes or a probe and motor ground.

A Test push button simulates both the over-temperature motor switch and low resistance in the pump seal chamber, and a Reset push button clears the alert indicators after (1) The Test push button has been depressed, or (2) An actual alert has been corrected.

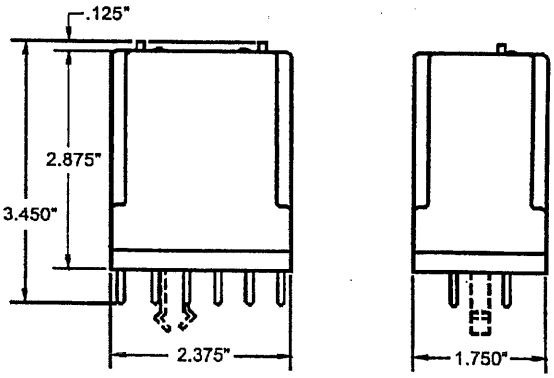


* Connection for 2 Wire Seal Fail Shown. ON 1 WIRE SEAL FAIL CIRCUITS, ATTACH PIN 3 TO COMMON GROUND POINT WITH PUMP GROUND WIRE.

Inputs / Outputs by Pin Number

SPECIFICATIONS

Input Voltage:	24-265 VAC, 50/60 Hz
Power Consumption:	2.8 Watts Max
Power to Sump:	Channel A - < 2μA @ 5VDC Channel B - < 25μA @ 12VDC
Fusing:	Control power transformer only
Relay Life:	Mechanical - 50 Million Operations Electrical - 10 Million Operations @ 5 Amps (1/6 th HP), 115VAC
Operating Temperature:	-4° F (-20° C) to +140° F (+60° C)
Seal Failure Trip Resistance:	120K Ohms (Nominal)



Inputs / Outputs by Pin Number

1. Over-temperature Output to N.C. Motor Temp. Switch (+12VDC)
2. Return From Motor Temperature Switch; Less Than 25μA
3. Return From Seal Failure Probe
4. Output to Seal Failure Probe; Under 6 Volts, < 2 microamps
5. Supply Neutral
6. 24-265 VAC (Nominal), 50 / 60 Hz
7. Normally Closed - Opens on High Temperature Fault
8. High Temperature Relay Common
9. Normally Open - Closes on High Temperature Fault
10. Normally Closed - Opens on Seal Failure Fault
11. Seal Failure Relay Common
12. Normally Open - Closes on Seal Failure Fault

Note: Relays are Electrically Held in Their "Normal" States

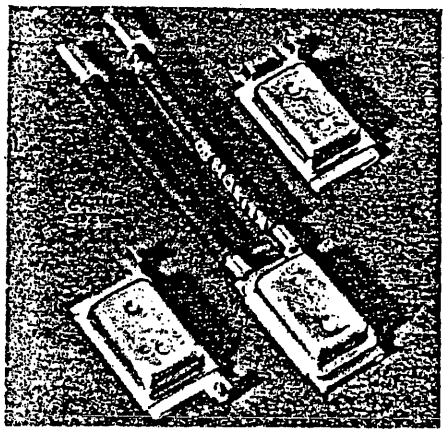
Multi-Tech Solutions, Inc. • P.O. Box 1264 • Conway • Arkansas 72033-1264 • Tel 501-764-1144 • Fax 501-764-1155

KLIXON® MINIATURE PROTECTOR

(REV I)

7AM SERIES SNAP-ACTING

- Mini-size simplifies installation
- Temperature calibrated and checked in controlled ambients
- Positive make and break with Klixon strip disc
- Uniform repeatability in opening and closing temperatures
- Fixed differential assures lower average winding temperature; no nuisance trip-out when restarting warm motors
- Sealed steel case allows varnish impregnation and baking
- Current and temperature sensitivity for maximum design flexibility
- Wide selection of leads and Mylar ™ insulating sleeves



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The Klixon® 7AM Protector is a miniature, lightweight thermally operated device designed to provide overheat protection for shaded pole and permanent split capacitor motors, fluorescent ballasts, solenoids, transformers and other electrically operated mechanisms.

OPERATION

The 7AM miniature, thermal protector employs the same snap-action principle as many millions of Klixon protectors presently in use. Its circuit is normally closed. The heat from the motor windings together with heat generated by the resistance of the thermal element causes the protector to snap open. When the temperature of the disc reaches its operating value which should correspond to the maximum safe limit of the winding, the disc snaps open to interrupt the circuit. This permits maximum output while limiting the windings to a safe operating temperature. When the protector reaches the reset temperature of the thermal element, it resets automatically, re-energizing the motor windings.

UL AND CSA APPROVALS

	Motor Protector Classed as "Component—Motor Protector devices Inherent Overheating Type"		Fluorescent Ballast Classed as "Component—Temperature—Indicating and Regulating Equipment"	
	UL Recognition Standard No. 547 Guide XEWR2 File E15962 dated 9-19-67	CSA Recognition Spec C22.2 No. 77 Guide 184-N-1390 File 11372C	UL Recognition Standard No. 935 Guide XAPX2 File E34618 dated 9-25-67	CSA Recognition † Spec C22.2 No. 74 Guide 400-E-O Class 4813 File 24458C
Operating temp°C	90°C thru 150°C		90°C thru 115°C	90°C thru 135°C
Electrical ratings Contacts	Not covered		5.5 amps-120V 1.75 amps-277V 1.00 amps-600V	4.5 amps-120V 2.5 amps-277V 1.5 amps-347V 1.25 amps-480V 1.0 amps-600V
Limited* short circuit	1000 amp circuit: 60 amp series fuse - 120V 50 amp series fuse - 240V 20 amp series fuse - 480V		200 amp circuit 20 amp series fuse - 120V and 277V	200 amp circuit 15 amp series fuse for above voltages
Group* fusing short circuit 95°C–150°C	5000 amp circuit: 125 amp series fuse - 120V and 240V 110 amp series fuse - 277V			

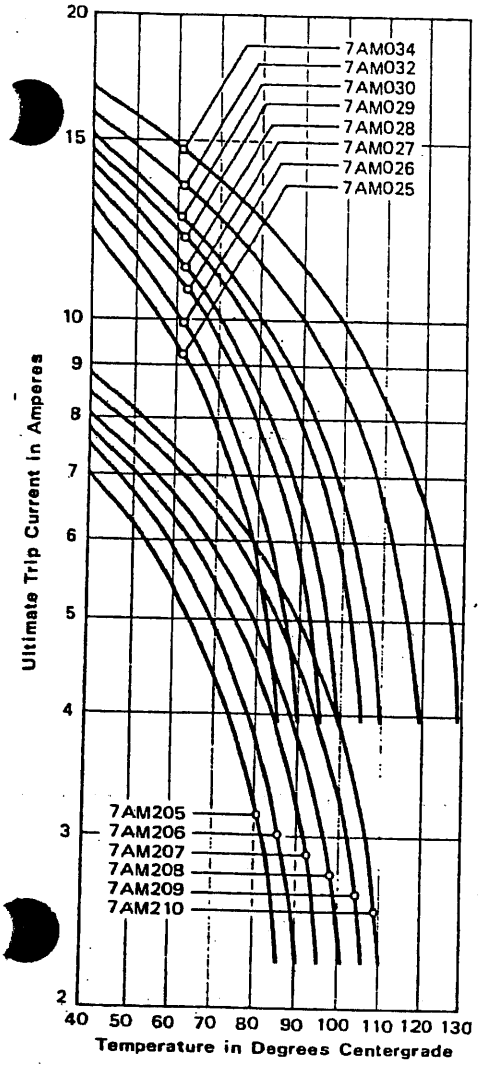
†For Canadian manufactured devices use file 24457C—also bulletin number 523A

*Contact factory for specific rating types covered.

TEXAS INSTRUMENTS
INCORPORATED

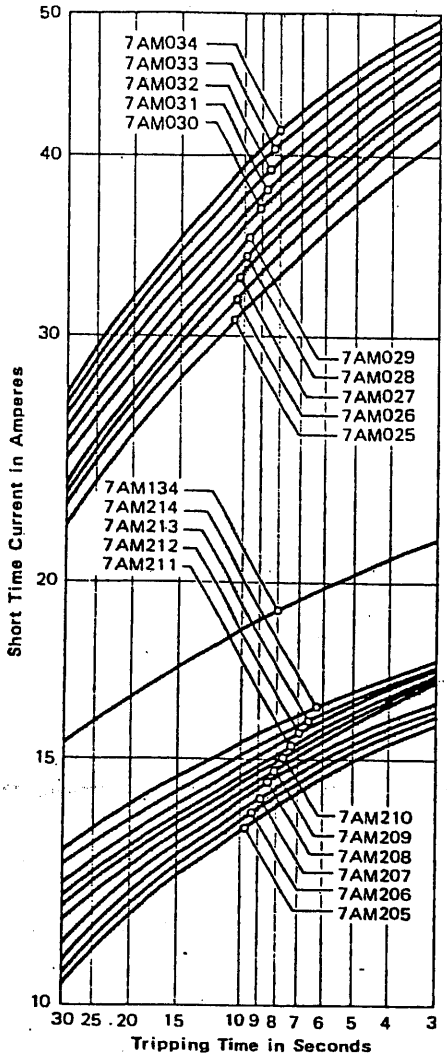
ULTIMATE TRIP CURRENT vs PROTECTOR AMBIENT TEMPERATURE

(Approximate: to be used for selecting samples only)



AVERAGE FIRST CYCLE TRIPPING TIME vs CURRENT IN 25°C AMBIENT

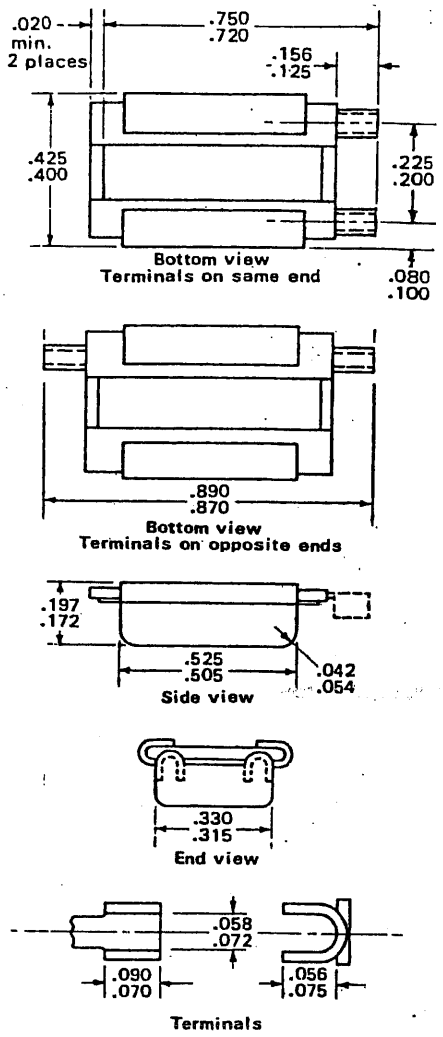
(Approximate: to be used for selecting samples only)



MAXIMUM CONTACT RATINGS

Devices have passed 10,000 cycles under the following conditions:

A	16 v-dc	20 amperes
B	115 v-ac	22 amperes
C	227 v-ac	8 amperes
D	600 v-ac	4 amperes



NUMBERING SYSTEM

Basic Device Number — 7AM 202 A 5 - 6

- 202 — Standard Opening Temperature
- A — Terminal Configuration
- 5 — Standard Opng Temp Tolerance
- 6 — Physical Characteristics

Opng temp °C	Disc thermostat metal ohms/cmf 70	125	350	468
	Code Numbers			
~~75~~	~~022~~	~~062~~	~~162~~	~~202~~
~~80~~	023	063	163	203
85	024	064	164	204
90	025	065	165	205
95	026	066	166	206
100	027	067	167	207
105	028	068	168	208
110	029	069	169	209
115	030	070	170	210
120	031	071	171	211
~~125~~	032	072	172	212
~~130~~	~~033~~	~~073~~	~~173~~	~~213~~
135	034	~~074~~	~~174~~	~~214~~
~~140~~	~~035~~	~~075~~	~~175~~	~~215~~
~~145~~	~~036~~	~~076~~	~~176~~	~~216~~
~~150~~	~~037~~	~~077~~	~~177~~	~~217~~

Code	Terminals
A	Terminals on same end
~~B~~	~~Terminals on opposite ends~~

Code	Tol
5	±5°C
~~8~~	~~±8°C~~
~~10~~	~~±10°C~~

Code
Assigned at factory

ENGINEERING TEST SAMPLES

Engineering test samples are available for your particular application. The information requested below will permit selection of sample ratings.

1. Nameplate data (or oper. voltage).
2. Maximum permissible temperature.
3. Minimum continuous current to produce this temperature.
4. Stalled rotor current.
5. Protector location temperature under condition of item 2.
6. Length of time required to reach maximum permissible temperature under condition of item 3.

For further information, write or call:
TEXAS INSTRUMENTS INCORPORATED
MOTOR CONTROLS MARKETING
ATTLEBORO, MASSACHUSETTS 02703
TELEPHONE: 617 222-2800

7AM 034 A5

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