RESTART OBSERVATIONS

(1) PUSHING "STOP" BUTTON DOES NOT IMMEDIATELY SHUTDOWN CRYO COMPRESSOR.

(2) TURN OFF CRYO COMPRESSOR POWER SWITCH BEFORE RESTARTING.

(3) BYPASS CRYO SAFETY TO REPOWER M-PROBE PRESS "RESET"

(4) OVERNIGHT PRESSURES
24 HOURS LATER

XPS
"000" ~~2X10~~ torr

~~LOAD LOCK~~
~~"000"~~
~~torr~~
~~10~~
3×10^{-2}

SMALL CRYO
~ 5 torr

(5) PRESS "RESET" ON M-PROBE BACKSIDE. INTERLOCK OVER-RIDE MUST BE ON TO OPERATE CERTAIN VALVES,

(6) RESTART TURBOS & ROUGH CRYO PUMPS

(7) RESTART CRYO COMPRESSOR, ~~REMOVE~~ SET CRYO SAFETY BYPASS TO NORMAL

(8) WAIT 3 HOURS TO COOL CRYOS

(9) RESTART ANODE COOLING

(10) OUR COMPUTER FAILED TO RETURN SANE, ie IT LOST ITS MIND.

POWER FAILURE STRATEGY

~~MPROBE AUTOMATICALLY SHUTSDOWN~~ (WRONG) DURING POWER FAILURE AND DOES NOT RESTART UNTIL RESET BUTTON IS PUSHED.

(TURBOS RESTART) (VALVES REMAIN CLOSED) (COMPUTER RESTARTS)
(ELECTRONICS ?_____) (ION GAUGES STAY ~~TURN~~ OFF) (M&W)

AUTO ACTIONS

1) TURBOS OFF ——— CURRENTLY THESE VENT ALSO.
2) VALVES CLOSE (VAcuum) — CURRENTY SMASHING LOADER ARMS
3) ELECTRONICS OFF
4) ALL GUNS OFF

WE WANT EVERYTHING EXCEPT THE CRYO & TURBO VACUUM PUMPS TO REMAIN DOWN FOLLOWIN ~~SUCCESSFUL PUMPDOWN~~ A BRIEF OUTAGE.

PUMPS & VALVES MAY RESTART IN 15 SEC.

~~CIRCULATOR~~

ADDITIONAL ACTIONS

1) M&W SHUTDOWN
2) CRYOPUMP COMPRESSOR (after 15 sec)

MPROBE MUST ALSO BE SHUTDOWN AND STAY DOWN IF

1) CRYOCOMPRESSOR STOPS (AFTER 15 SECONDS)
2) LAB WATER COOLING STOPS (AFTER 15 SECONDS) { SERVES M&W CRYO, GUNS, TURBOS
3) EMERGENCY STOP BUTTON IS ACTUATED (IMMEDIATE)

CRYOCOMPRESSOR MUST BE SHUTDOWN AND STAY DOWN IF

1) COOLING WATER FAILS MORE THAN 15 SECONDS
2) POWER FAILS MORE THAN 15 SECONDS

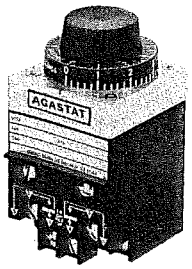
LAB COOLING WATER LOOP

SHOULD RESTART ON RETURN OF POWER. REQUIRES NEW PARTS FROM NESLAB.

RISER PIPE VALVES CLOSED WHEN NESLAB IS OFF.

AGASTAT®

7000 Series timing relay Models 7012, 7022, 7032 INSTALLATION AND OPERATION



Every AGASTAT timing relay is a precise timing instrument which balances pneumatic, electrical and mechanical forces in a unique design using a minimum of moving parts. Its accuracy and performance to specifications have been carefully tested before shipment. Properly applied, it offers exceptional life expectancy. A few minutes spent in familiarizing yourself with these instructions will help you get the best possible service from this unit in your application.

Because of the skilled calibration and adjustment required on certain components prior to final assembly, we recommend that field servicing be limited to the replacement of the switchblock and coil assemblies, listed below. These have been designed to insure factory-built performance after field servicing without elaborate calibration. In cases where damage or abuse make it impossible to restore satisfactory performance by replacing these assemblies, the unit should be returned to the factory for repair or replacement.

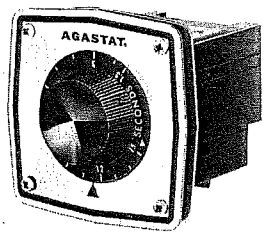
MOUNTING INSTRUCTIONS

A. VERTICAL

Normal mounting for the basic 7000 Series unit is in a vertical position, from the back of the panel. Four 8-32 tapped holes are provided in the back plate, making it interchangeable with earlier models. Mounting screws should not project more than 5/32" into the back of the unit, to prevent internal damage.

A bracket for mounting the unit from the front, and the screws required to attach it to the relay are also supplied with each unit. The bracket extends approximately 3/8" from each side of the unit.

B. HORIZONTAL/PANELMOUNT

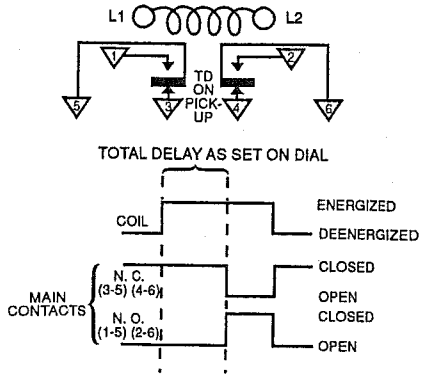


All basic 7000 Series units may be mounted horizontally. However, a dial calibration error (as much as 32% in some units) will result unless the timer is factory equipped with horizontal operation option X or Y1. A unit factory equipped with vertical-horizontal operation option Y2 will require the removal of the Position Compensation Spring in order to maintain accurate calibration. This spring may be removed after the removal of the plastic dust cover, which is fastened to the bottom of the timer with two screws. The dust cover must be replaced after removing the spring.

If the Panel Mounting Kit (option X) is added in the field to units not factory equipped with options Y1 or Y2, an error in dial calibration will result.

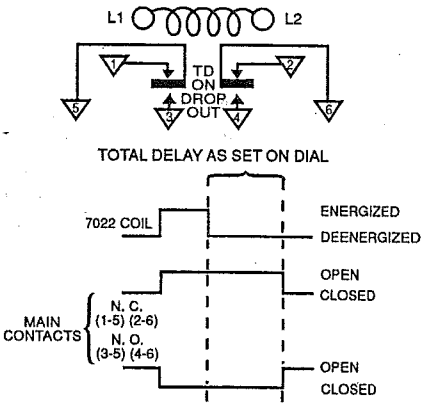
On-Delay Models, 7012

(Delay on pick-up)



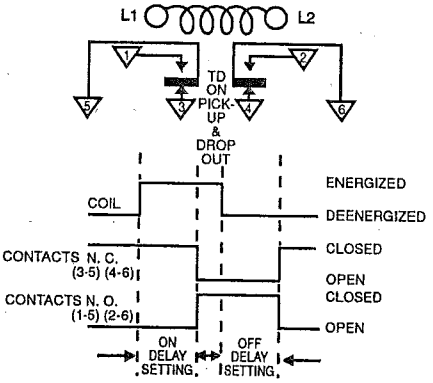
Off-Delay Models, 7022

(Delay on drop-out)



On-Delay, Off-Delay Models, 7032

(Double Head)



LINEAR TIMING RANGES

Time Range Code	Models 7012, 7022	*Model 7032
A	.1 to 1 Sec.	.2 to 2 Sec.
B	.5 to 5 Sec.	.7 to 7 Sec.
C	1.5 to 15 Sec.	2 to 20 Sec.
D	5 to 50 Sec.	10 to 100 Sec.
E	20 to 200 Sec.	30 to 300 Sec.
F	1 to 10 Min.	1.5 to 15 Min.
H	3 to 30 Min.	3 to 30 Min.
I	6 to 60 Min.	Not avail.
J	3 to 120 Cyc.	Not avail.
K	1 to 300 Sec.	Not avail.

Basic models are furnished with dials calibrated in linear increments covering the range selected. In addition, time-calibrated ranges B through K provide non-linear adjustment from .2 second to the beginning of the linear zone. For easiest adjustment and lowest cost, the shortest time range suitable for the application should be selected.

*Model 7032 is available with letter calibrated dials only. The upper end of the time ranges in this model may be twice the values shown.

POWER FAIL SYS

COIL DATA

Coil Part Number	Code Letter	Rated Voltage @ 60 Hz	Operating Voltage Range @ 60 Hz	Rated Voltage @ 50 Hz	Operating Voltage Range @ 50 Hz
7000—	A	120	102-132	110	93.5-121
	B	240	204-264	220	187-242
	C	480	408-528		
	D	550	468-605		
	E	24	20.5-26.5		
	F			127	108-140
	G			240	204-264
	H	12	10.2-13.2		
	I	6	5.1-6.6		
	J	208	178-229		
	K	DUAL VOLTAGE COIL (COMBINES A & B)			

AC

AC SPECIALS L1, L2, etc.

A C Coils (Part No. = 7000 followed by dash and code letter above.)

Coil Part Number	Code Letter	Rated Voltage	Operating Voltage Range DC
7010—	M	28	22.5-33.5
	N	48	38.5-57.5
	O	24	19.2-28.8
	P	125	100-150
	Q	12	9.6-14.4
	R	60	48-74
	S	250	200-300
	T	550	440-660
	U	16	12.8-19.2
	V	32	25.6-38.4
	W	96	76.8-115
	Y	6	4.8-7.2
	Z	220	176-264

DC

DC SPECIALS X1, X2, etc.

D C Coils (Part No. = 7010 followed by dash and code letter above.)

All units draw approximately 8 watts power at rated voltage.

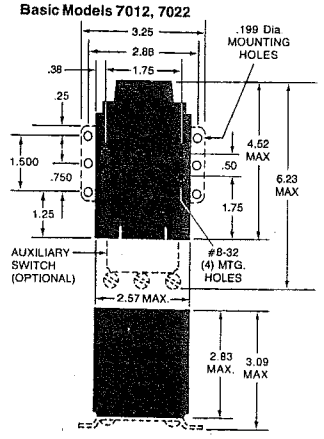
Minimum operating voltages are based on vertically mounted 7012 (on-delay) units. 7012 horizontally mounted or 7022 (off-delay) vertically or horizontally mounted units will operate satisfactorily at minimum voltages approximately 5% lower than those listed.

A C units drop out at approximately 50% of rated voltage. D C units drop out at approximately 10% of rated voltage.

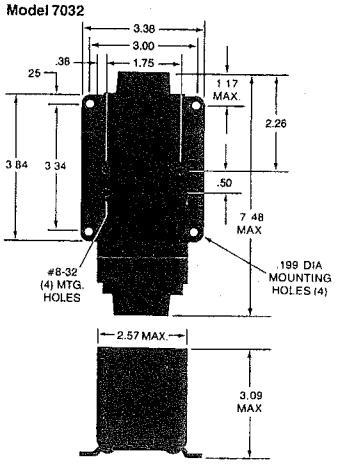
All units may be operated on intermittent duty cycle at voltages 10% above the listed maximums. (Intermittent duty — maximum 50% duty cycle and 30 minutes "on" time.)

Dimensions

Basic Models 7012, 7022

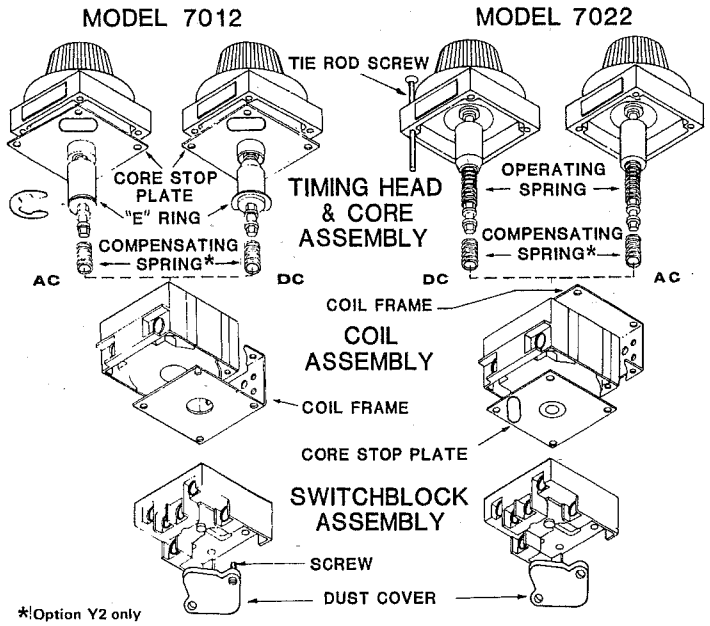


Model 7032



REPLACING SWITCHBLOCK AND COIL ASSEMBLIES — MODEL 7012 AND 7022

Switchblock assemblies are universally interchangeable between all standard 7000 Series units. The same assembly is used for A C and D C models for delay on pull-in or delay on dropout service. Neither timing head/core assembly nor coil assembly is interchangeable between A C and D C models.



*Option Y2 only

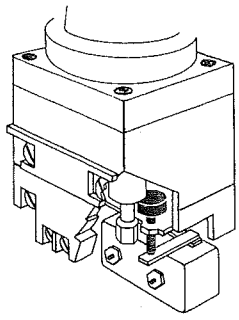
AUXILIARY SWITCH ADJUSTMENT

MODEL 7012
(INSTANT TRANSFER AUX. SWITCH)
(CODE L OR CODE LL)

Aux. switch should transfer immediately when relay coil is energized, and should reset shortly before solenoid core returns to its normal position, following deenergization. If it fails to reset before end of core's downward stroke, loosen screw in slotted hole of mounting bracket and move switch closer to terminal block.

TWO STEP AUX. SWITCH (CODE T)

Aux. switch contacts should transfer following first delay period after coil energization, and should reset shortly before core returns to its normal position, following coil deenergization. To increase first delay period, increase the distance between actuator screw head and arm by turning it clockwise, using 1/4" open end wrench.*



CODE L & LL

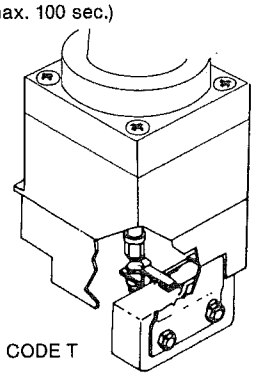
MODEL 7022
INSTANT TRANSFER AUX. SWITCH
(CODE T)

Aux. switch should transfer immediately when relay coil is energized, and should reset shortly before spindle returns to its normal position, following deenergization. To increase aux. switch delay period, increase the distance between actuator screw head and arm by turning it clockwise, using 1/4" open end wrench.

TWO STEP AUX. SWITCH (CODE T)

Check operation as for Instant Transfer, above. Increase first delay period by turning actuator screw clockwise until the desired delay before aux. switch transfer is reached.

*First delay is independently adjustable, but must be no more than 30% of overall delay. (Recommended max. 100 sec.)



CODE T

CONTACT RATINGS

Contact Capacity in Amperes (Resistive Loads)

Contact Voltage	Min. 100,000 Operations	Min. 1,000,000 Operations
30 vdc	15.0	7.0
110 vdc	1.0	0.5
120 v 60 Hz	20.0	15.0
240 v 60 Hz	20.0	15.0
480 v 60 Hz	12.0	10.0

Contact Ratings are listed under the UL Component Recognition Program for 100,000 operations:

10 Amps Resistive, 240 VAC
¼ Horsepower, 120 VAC/240 VAC
15 Amps, 30 VDC
5 Amps., General Purpose, 600 VAC
} Per Pole

REPLACEMENT ASSEMBLIES

	Part No.
AC Coil Assembly	7000-*
DC Coil Assembly	7010-*
Switchblock Assembly	700030
Auxiliary Switch Kit (Code L)	700047
Auxiliary Switch Kit (Code T)	700121
Auxiliary Switch Kit (Code LL)	700048

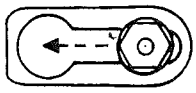
*Specify voltage with code letter.

REMOVING SWITCHBLOCK

(Before disassembling unit: Slice decal on right side of unit with razor blade between switchblock and coil assembly.)

1. Remove four tie rod screws.
2. Hold timing head and coil assembly in one hand, switchblock in the other.
3. Slide switchblock 1/2" forward of coil assem to center spindle in large end of keyhole slot in switch blade. (See diagram A).
4. Slowly lift timing head and coil assembly off switchblock, being careful to keep spindle collar away from switchblade while withdrawing it.

REVERSE THIS PROCEDURE TO INSTALL NEW SWITCHBLOCK



A

REMOVING COIL

Follow steps 1 to 4 above, then:

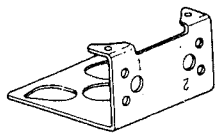
5. Remove timing head and core assembly. (On Model 7022 units the core stop plate and operating spring are loose pieces, located below the core rather than attached to the timing head and core assembly, as on the Model 7012 units. These two pieces should be removed before removing the coil frame, to prevent loss of the loose spring.)

   7012 models require removal of "E" ring from core to permit removing core from coil.

6. Slide off coil frame.

When installing new coil, be sure to replace coil frame with proper side up. Number "1" on back of frame should be up on 7012 (Delay on Pull-in) Models, Number "2" should be up on 7022 (Delay on Drop-out) Models. See Diagram B.

On 7012 models, replace "E" ring in core slot after assembling coil frame to coil.



B

WARRANTY

This product is warranted against mechanical and electrical defects for a period of two years from date of shipment from factory if it has been installed and used in accordance with factory recommendations. Any field repairs or modifications to the original unit will void this warranty. Amerace Corporation's liability is limited to replacement of parts proved defective in workmanship or materials. (W-AB2).

FOR REPAIR SERVICE

Return defective units to:
AMERACE ELECTRONIC COMPONENTS
ATTN PRODUCT SERVICE DEPT.
7474 UTILITIES ROAD
PUNTA GORDA, FL 33982

AMERACE ELECTRONIC COMPONENTS
7474 UTILITIES ROAD, PUNTA GORDA, FL 33982
TEL. (813) 575-8400 • FAX. (813) 575-8484

70-2
5/88
(supersedes 4/85)
PN 39999-03
Printed in U.S.A.

▌= Revised since last printing.

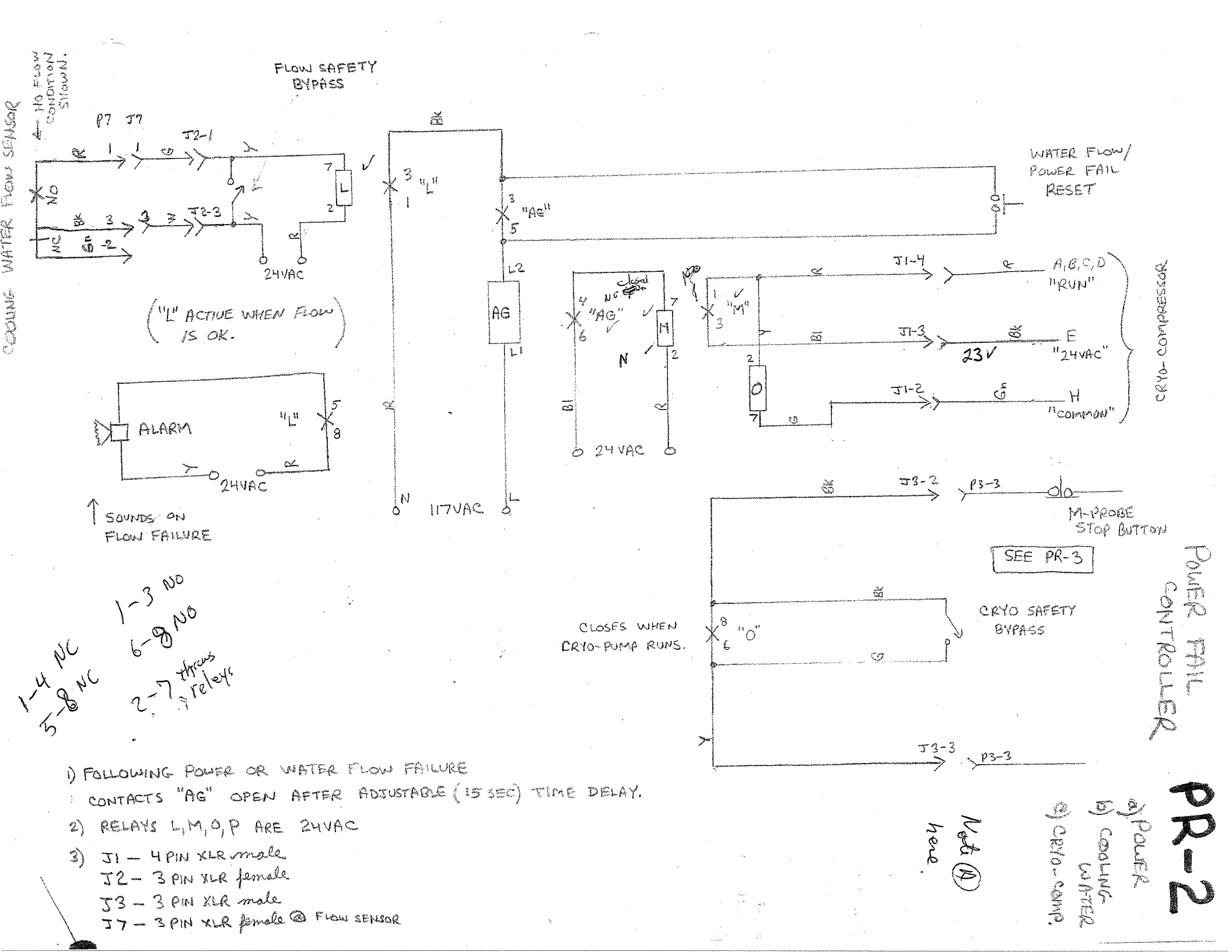
PR-2 CIRCUITS TAKE THE FOLLOWING ACTION:

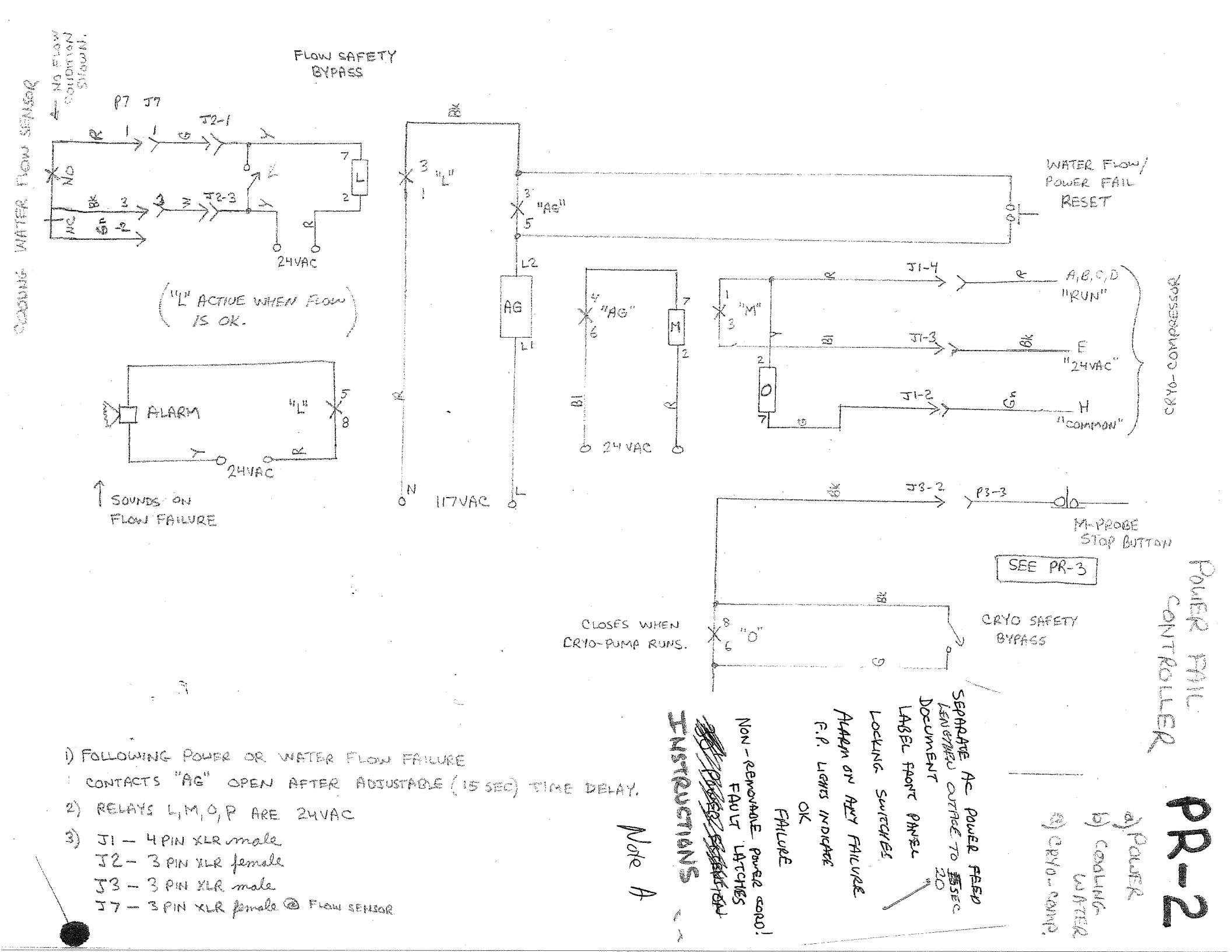
3 COOLING WATER FLOW FAILURE:

[redacted] IN 15 SECS "AG" RELEASES AND THE CRYO COMPRESSOR [redacted] IS SHUT OFF.

WHEN THE CRYO-COMPRESSOR SHUTS OFF THE M-PROBE STOP BUTTON IS PUSHED SHUTTING DOWN ALL ELECTRONICS & PUMPS INCLUDING TURBO & MECH.

(?1)

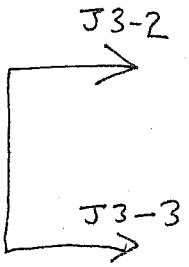

COOLING WATER FLOW SENSOR
← NO FLOW CONDITION SHOWN.
P7 J7
J2-1
J2-3
NO
NC
24VAC
("L" ACTIVE WHEN FLOW IS OK.)
FLOW SAFETY BYPASS
"L"
"AG"
AG
L1
L2
N
117VAC
WATER FLOW/ POWER FAIL RESET
"AG"
M
24 VAC
"M"
J1-4
A,B,C,D "RUN"
J1-3
23V
E "24VAC"
J1-2
H "COMMON"
CRYO-COMPRESSOR
ALARM
"L"
24VAC
↑ SOUNDS ON FLOW FAILURE
J3-2
P3-3
M-PROBE STOP BUTTON
SEE PR-3
CLOSES WHEN CRYO-PUMP RUNS.
"O"
CRYO SAFETY BYPASS
J3-3
P3-3
POWER FAIL CONTROLLER
PR-2
a) POWER
b) COOLING WATER
c) CRYO-COMP.
Note (A) here.
1-3 NO
6-8 NO
2-7 bypass relays
1-4 NC
5-8 NC
1) FOLLOWING POWER OR WATER FLOW FAILURE : CONTACTS "AG" OPEN AFTER ADJUSTABLE (15 SEC) TIME DELAY.
2) RELAYS L, M, O, P ARE 24VAC
3) J1 – 4 PIN XLR male
J2 – 3 PIN XLR female
J3 – 3 PIN XLR male
J7 – 3 PIN XLR female @ FLOW SENSOR


PR-2
POWER FAIL CONTROLLER
a) POWER
b) COOLING WATER
c) CRYO-COMP.
SEPARATE AC POWER FEED (LENGTHEN OUTAGE TO 220 SEC)
DOCUMENT
LABEL FRONT PANEL
LOCKING SWITCHES
ALARM ON ANY FAILURE
P.P. LIGHTS INDICATE
OK
FAILURE
NON-REMOVABLE POWER CORD!
FAULT LATCHES
INSTRUCTIONS
Note A
1) FOLLOWING POWER OR WATER FLOW FAILURE CONTACTS "AG" OPEN AFTER ADJUSTABLE (15 SEC) TIME DELAY.
2) RELAYS L, M, O, P ARE 24VAC
3) J1 – 4 PIN XLR male
J2 – 3 PIN XLR female
J3 – 3 PIN XLR male
J7 – 3 PIN XLR female @ FLOW SENSOR
COOLING WATER FLOW SENSOR
NO FLOW CONDITION SHOWN.
FLOW SAFETY BYPASS
P7 J7
J2-1
J2-3
NO
NC
L
24VAC
("L" ACTIVE WHEN FLOW IS OK.)
ALARM
"L"
24VAC
SOUNDS ON FLOW FAILURE
"L"
"AG"
AG
L2
L1
N
117VAC
"AG"
M
24 VAC
WATER FLOW/ POWER FAIL RESET
"M"
J1-4
A,B,C,D "RUN"
J1-3
E "24VAC"
O
J1-2
H "COMMON"
ASSEMBLED ONTO
J3-2
P3-3
M-PROBE STOP BUTTON
SEE PR-3
CLOSES WHEN CRYO-PUMP RUNS.
"O"
CRYO SAFETY BYPASS

DEFAULT PLUGS

WHEN THE PR-2 POWER FAIL CONTROLLER IS REMOVED THE FOLLING JUMPERS CAN BE INSTALLED TO ALLOW CONTINUED OPERATION (W/O SAFETY PROTECTIONS).

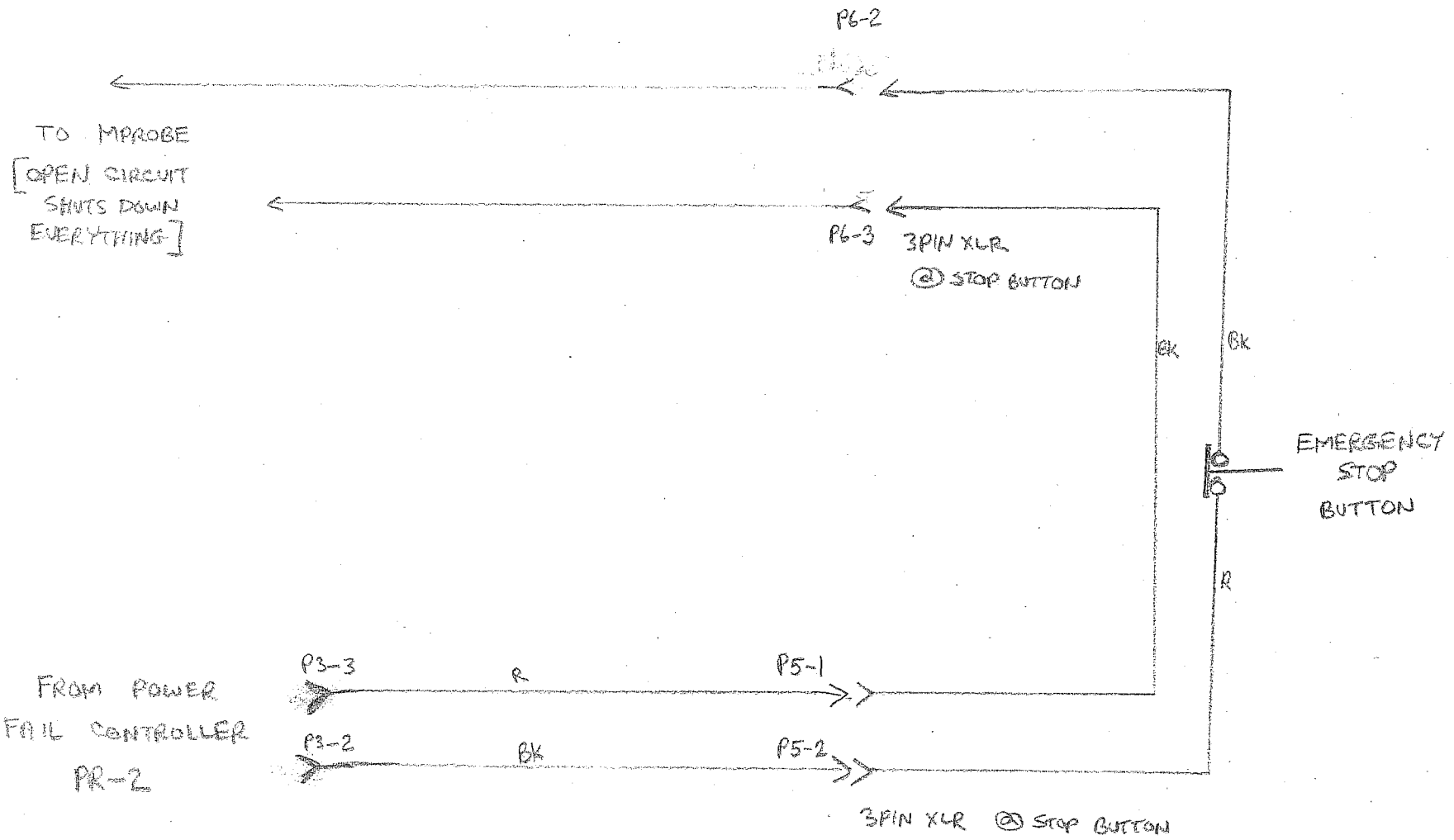
P2 – NO CONNECTIONS NECESSARY { WATER FLOW SENSOR



STOP BUTTON
(3 PIN XLR MALE)

CRYO COMPRESSOR
(4 PIN XLR MALE)

FOR PR-2 Rev 1
2/97 APR


P6-2
TO MPROBE
[OPEN CIRCUIT SHUTS DOWN EVERYTHING]
P6-3
3PIN XLR
@ STOP BUTTON
BK
BK
EMERGENCY STOP BUTTON
R
FROM POWER FAIL CONTROLLER PR-2
P3-3
R
P5-1
P3-2
BK
P5-2
3PIN XLR @ STOP BUTTON

PR13