REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

R5-B

INPUT PIN	V	Y	TC-3	TC-4	b	e	h	k	TC-9	TC-10 (TYPE-E)	A	D	G	K	N	S
MADC 25, CH #	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
	AP0 EF3 HEPA FILTER PRESSURE (D:ARHEPA)	EF3 LOW AP0 AIR PRESSURE (D:AR3LOW)	PMAG COLLIMATOR UPSTREAM TEMP (D:PMTC11)	PMAG COLLIMATOR DWNSTREAM TEMP (D:PMTC12)	AP0 TO AP1 OUTSIDE AIR PRESSURE (D:AROIP)	AP0 TO ROOF AIR PRESSURE (D:ARORP)	AP0 TO TUNNEL AIR PRESSURE (D:AROTP)	AP1 TO EF3 IN AIR PRESSURE (D:AR1FIP)	AP0 VAULT AIR TEMP (D:ARVLTT)	LENS PRIMARY PLATE TC (D:LNTC12)	AP0 AIR RADIATION MONITOR (GAIN=1000) (D:ARM1)	AP0 VAULT AIR HUMIDITY (D:ARVLTH)	TARGET AIR PRESSURE - VAULT (D:TRMV)	TARGET AIR PRESSURE - PUMP (D:TRMP)	AP0 EF3 AIR FLOW (D:ARFL1)	AP0 EF1 STACK AIR FLOW (D:ARFL2)
OUTPUT GROUP PIN	A	D	G	K	N	S	V	Y	A	D	G	K	N	S	V	Y

OUTPUT GROUP B → TO ALARM CRATE R6-A, GROUP B

OUTPUT GROUP A → TO ALARM CRATE R6-A, GROUP A

R5-C

INPUT PIN	TC-1 (TYPE-E)	TC-2 (TYPE-E)	TC-3 (TYPE-E)	TC-4 (TYPE-E)	TC-5	TC-6	V (1)	Y (1)	TC-9	TC-10	A	D	G	K	N	S
MADC 25, CH #	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	COLLECTION LENS TEMP-1 (150 DEG C) (D:LNTC1)	COLLECTION LENS TEMP-2 (150 DEG C) (D:LNTC2)	COLLECTION LENS TRANSFORMER SECONDARY DS (150 DEG C) (D:LNTC3)	COLLECTION LENS TRANSFORMER SECONDARY US (150 DEG C) (D:LNTC4)	COLLECTION LENS CW INLET TEMP (D:LNTC5)	COLLECTION LENS CW OUT TEMP (D:LNTC6)	COLLECTION LENS WATER SUPPLY TEMP (D:LNTC7)	COLLECTION LENS WATER RETURN TEMP (D:LNTC8)	LENS WATER PUMP MOTOR TC (D:LNMOTR)	COLLECTION LENS HEAT EXCHANGE OUT TC (D:LNTC9)	COLLECTION LENS WATER SUPPLY FLOW (D:LNWM1)	COLLECTION LENS WATER RETURN FLOW (D:LNWM2)	COLLECTION LENS WATER SUPPLY PRESSURE (D:LNWP1)	COLLECTION LENS WATER RETURN PRESSURE (D:LNWP2)	COLLECTION LENS WATER RETURN CONDUCTIVITY (D:LNWN1)	COLLECTION LENS CIRC PUMP INLET PRESSURE (D:LNWP5)
OUTPUT GROUP PIN	A	D	G	K	N	S	V	Y	D	A	G	K	N	S	V	Y

OUTPUT GROUP B → TO ALARM CRATE R6-C, GROUP A

OUTPUT GROUP A → TO ALARM CRATE R6-B, GROUP A

R5-F

INPUT PIN	TC-1	TC-2	TC-3	TC-4	TC-5	TC-6	TC-7	TC-8	V	Y	A	D	G	K	N	S
MADC 25, CH #	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
	PMAG CORE TC UP STREAM (D:PMTC1)	PMAG CORE TC DWN STREAM (D:PMTC2)	UPPER VAULT AIR TEMP (D:VLTAIR)	TARGET COOLING AIR TEMP (D:TGTTAT)	PMAG WATER RETURN TC-A (D:PMTC5)	PMAG WATER RETURN TC-B (D:PMTC6)	SPARE TEMP	SPARE TEMP	DUMP WATER SUPPLY PRESSURE (D:DPWP2)	DUMP WATER FILTER OUT PRESSURE (D:DPWP3)	COLLECTION LENS CW IN PRESSURE (D:LNWP3)	YARGET SEM VACUUM (D:TRSMV)	COLLECTION LENS CW OUT PRESSURE (D:LNWP4)	COLLECTION LENS DEIONIZED WATER CONDUCTIVITY (D:LNWN2)	COLLECTION LENS 50 AMP BIAS SUPPLY (D:LNBIS)	
OUTPUT GROUP PIN	A	D	G	K	N	S	V	Y	A	D	G	K	N	S	V	Y

OUTPUT GROUP B → OPEN

OUTPUT GROUP A → TO ALARM CRATE R6-D, GROUP A

R5-G

INPUT PIN	TC-1	TC-2	TC-3	TC-4	TC-5	TC-6	TC-7	V (1)	Y (1)	b (1)	A	D	G	K	N	S
MADC 25, CH #	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
	BEAM DUMP TEMP 1 (D:DPTC1)	BEAM DUMP TEMP 2 (D:DPTC2)	BEAM DUMP TEMP 3 (D:DPTC3)	BEAM DUMP TEMP 4 (D:DPTC4)	BEAM DUMP TEMP 5 (D:DPTC5)	BEAM DUMP TEMP 6 (D:DPTC6)	BEAM DUMP TEMP 7 (D:DPTC7)	DUMP COOLING SUPPLY #1 (D:DPTC8)	DUMP COOLING SUPPLY #2 (D:DPTC9)	DUMP COOLING RETURN #1 (D:DPTC10)	DUMP WATER RESERVOIR PRESSURE (D:DPHP1)	DUMP WATER RETURN FLOW (D:DPWM1)	DUMP WATER FILTER FLOW (D:DPWM2)	DUMP WATER PUMP INLET PRESSURE (D:DPWP1)	LENS RES TANK WATER LEVEL (D:LNWTRL)	LENS RES TANK WTR ULTLEV (D:LNWTRU)
OUTPUT GROUP PIN	A	D	G	K	N	S	V	Y	A	D	G	K	N	S	V	Y

TO ALARM CRATE R6-C, GROUP B

OUTPUT GROUP B → TO ALARM CRATE R6-E, GROUP B

OUTPUT GROUP A → TO ALARM CRATE R6-E, GROUP A

55

R5-H

INPUT PIN	TC-1	TC-2	TC-3	TC-4	TC-5	TC-6	V	Y	b	e	h	k	p	s	v	y
MADC 24, CH #	48	49	50	51	52	53	54	55, Not Used 9, Via Cable	56	57	58, Not Used 17, Via Cable	59, Not Used 18, Via Cable	60, Not Used 16, Via Cable	61	62	63
								COLL LENS XFRMR WATER RETURN FLOW (D:LNWM6)	VLT SUPPLY AIR HUMIDITY (D:VLTHUM)	VAULT SUPPLY AIR TEMP (D:VLTTMP)	PMAG WATER SUPPLY PRESSURE (D:PMWP1)	PMAG FILTER OUTLET PRESSURE (D:PMWP2)	PMAG WATER PUMP INLET PRESSURE (D:PMWP5)			
OUTPUT GROUP PIN	A	D	G	K	V	Y	N	S	A	D	G	K	N	S	V	Y

Alarm Cr R6B, Slot 3 (Via Cable)

Alarm Cr R6D, Slot 6 (Via Cable)

Alarm Cr R6D, Slot 8 (Via Cable)

OUTPUT GROUP B → TO ALARM CRATE R4-F, GROUP A

OUTPUT GROUP A → TO ALARM CRATE R4-E, GROUP A

R5-I

INPUT PIN	A	D	G	K	N	S	V	Y	TC-1	TC-2	TC-3	TC-4	TC-5	TC-6	TC-7	TC-8
MADC , CH #																
OUTPUT GROUP PIN	A	D	G	K	N	S	V	Y	A	D	G	K	N	S	V	Y

OUTPUT GROUP B → OPEN

OUTPUT GROUP A → OPEN

MADC OUTPUT PIN (FOR ALL AMPLIFIER CRATES)	A	D	G	K	N	S	V	Y	b	e	h	k	p	s	v	y

NOTES:

1 = [ ] = Amplifier card is NOT required. The voltage input pin, is jumpered to the Output and MADC pins.

2 - ALL Thermocouple Amplifier Modules, are 0-100 degC, Type-J, 0-10V output, unless specified otherwise.

3 - ALL Non Thermocouple Amplifier Modules, have a gain of 1, unless specified otherwise.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
PARTS LIST			

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	B WISNER	9-21-1993
FRACTIONS	DECIMALS	ANGLES	DRAWN	B WISNER	2-17-2003
±	±	±	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES 1/64 MAX.
2. DO NOT SCALE DRAWING
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5 STD'S

MAX. ALL MACHINED SURFACES

USED ON

MATERIAL

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

ANTIPROTON SOURCE
AP0 AMPLIFIER CRATES
CRATE INTERCONNECTION DIAGRAM

SCALE	FILMED	DRAWING NUMBER	REV.