5 2 REVISION HISTORY APPROVAL DESCRIPTION REV EC0 DATE BY P20014-9002-00 A0 N/A 1/18/22 JΗ Josh Hirsh Release to prototype SAO internal harness Α1 N/A 9/27/23 JH Josh Hirsh General improvments **Drawing Index** QA Testing: All pins must be checked for continuity **Drawing Name Drawing Description** and shorts against the design. P20014-9002-00: 1 Cover Page P20014-9002-00: 2 test harness line diagram P20014-9002-00: 3 thermometry harness line diagram P20014-9002-00: 4 heater and motor harness line diagr... P20014-9002-00: 5 test harness schematic P20014-9002-00: 6 thermometry harness schematic P20014-9002-00: 7 warm up heaters schematic P20014-9002-00: 8 selector wheel schematic P20014-9002-00: 9 **Build Report** P20014-9002-00: 10 **Build Report** P20014-9002-00: 11 **Build Report** P20014-9002-00: 12 **Build Report**

Build Report

Build Report

Build Report

Build Report

Build Report

Build Report

BOM

BOM

P20014-9002-00: 13

P20014-9002-00: 14

P20014-9002-00: 15

P20014-9002-00: 16

P20014-9002-00: 17

P20014-9002-00: 18

P20014-9002-00: 22

P20014-9002-00: 23

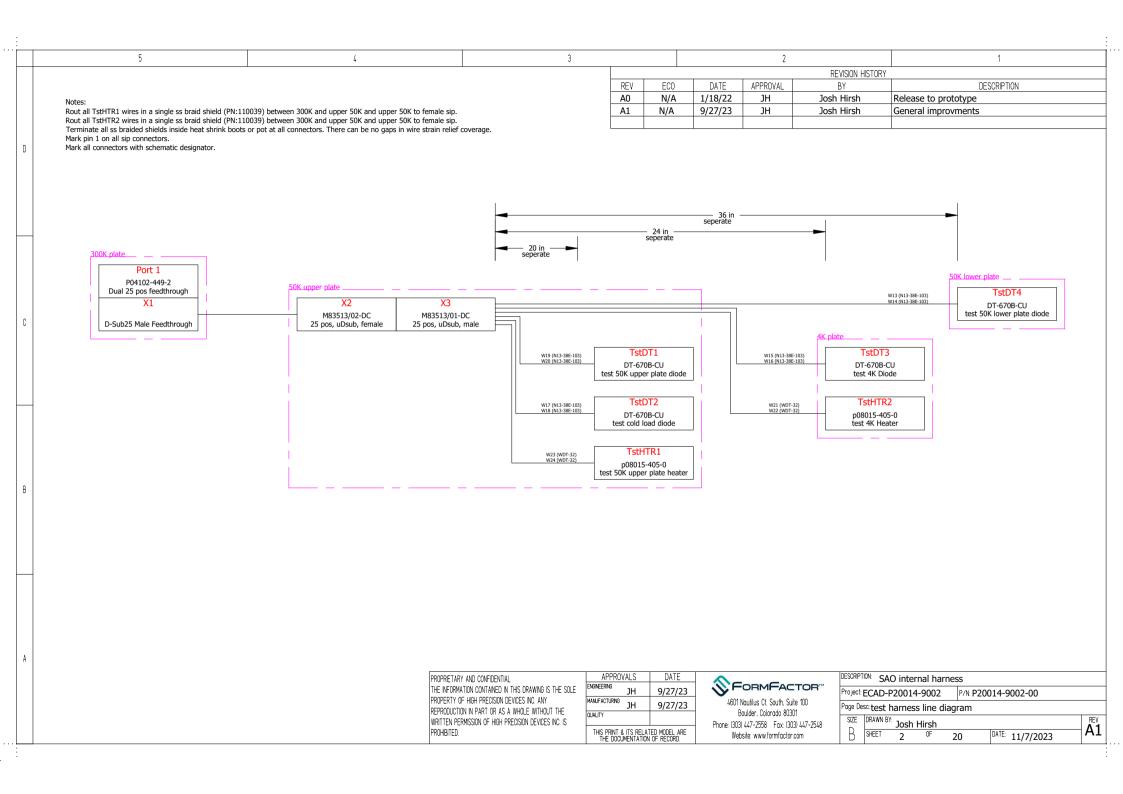
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF HIGH PRECISION DEVICES MANUFACTURING 1H INC. ANY REPRODUCTION IN PART OR AS A WHOLE QUALITY WITHOUT THE WRITTEN PERMISSION OF HIGH PRECISION DEVICES INC. IS PROHIBITED.

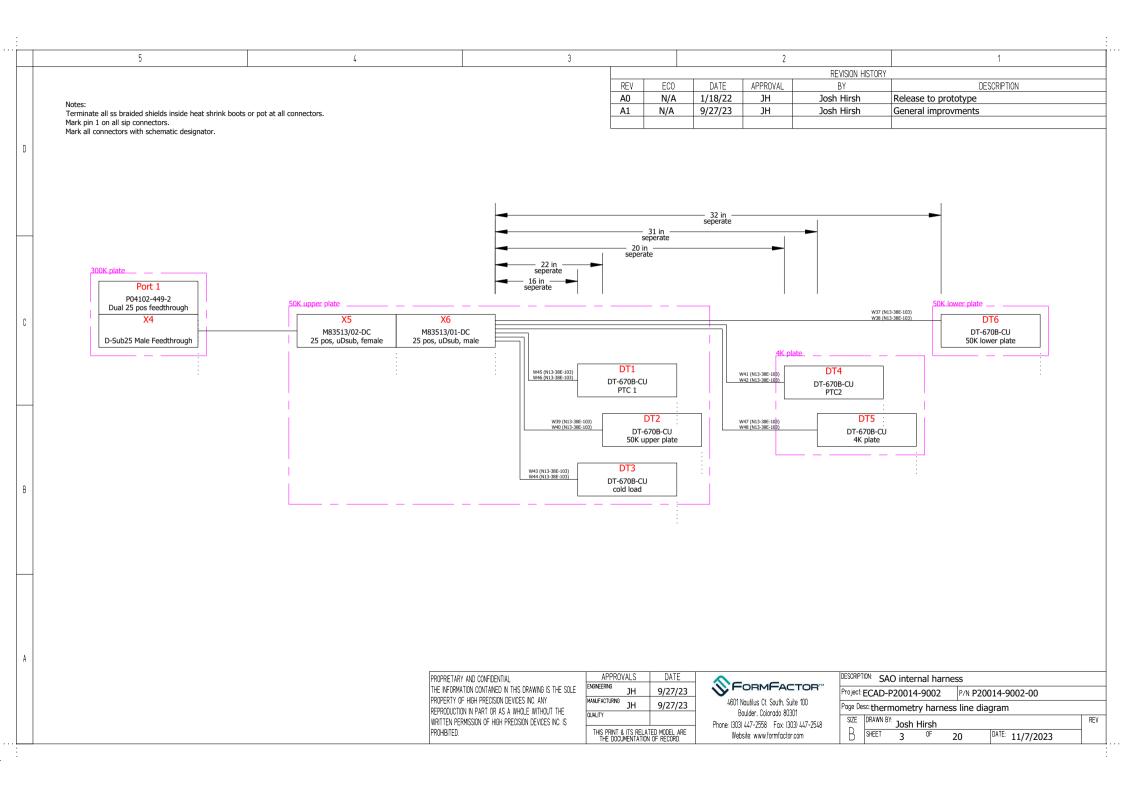
APPROVALS DATE ENGINEERING 9/27/23 9/27/23 THIS PRINT & ITS RELATED MODEL ARE THE DOCUMENTATION OF RECORD.

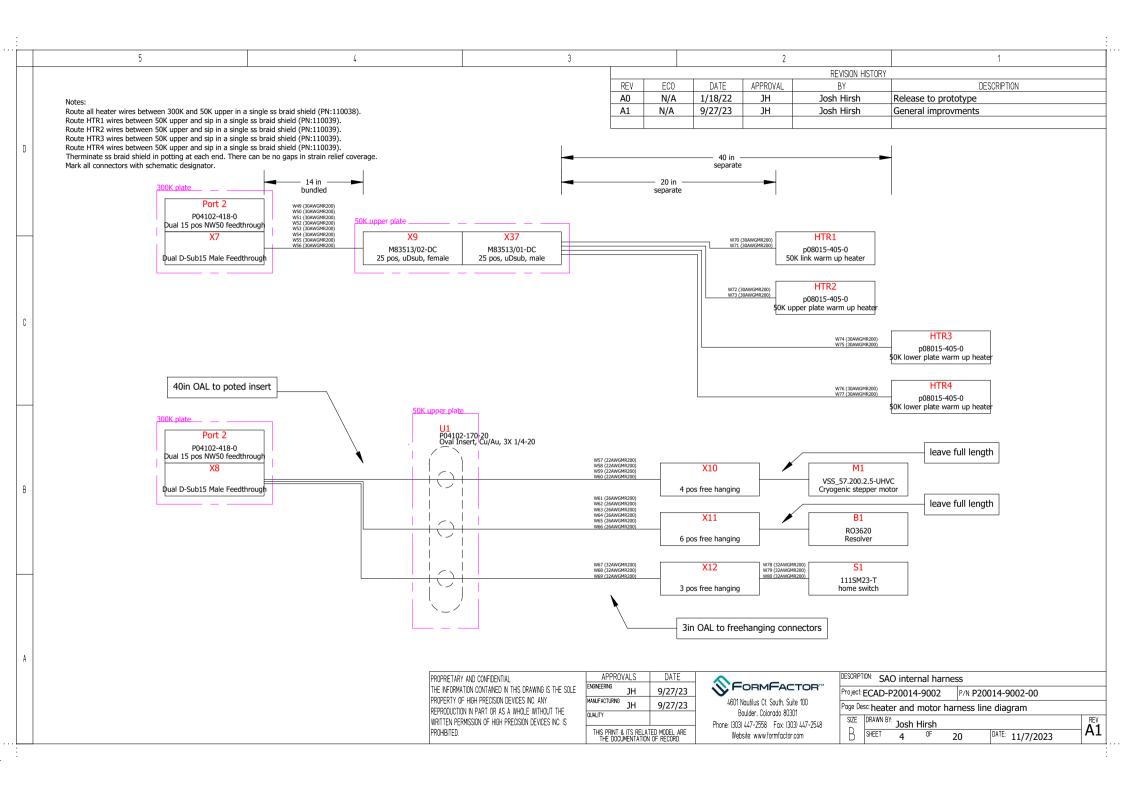
SFORMFACTOR™ 4601 Nautilus Ct. South, Suite 100 Boulder, Colorado 80301

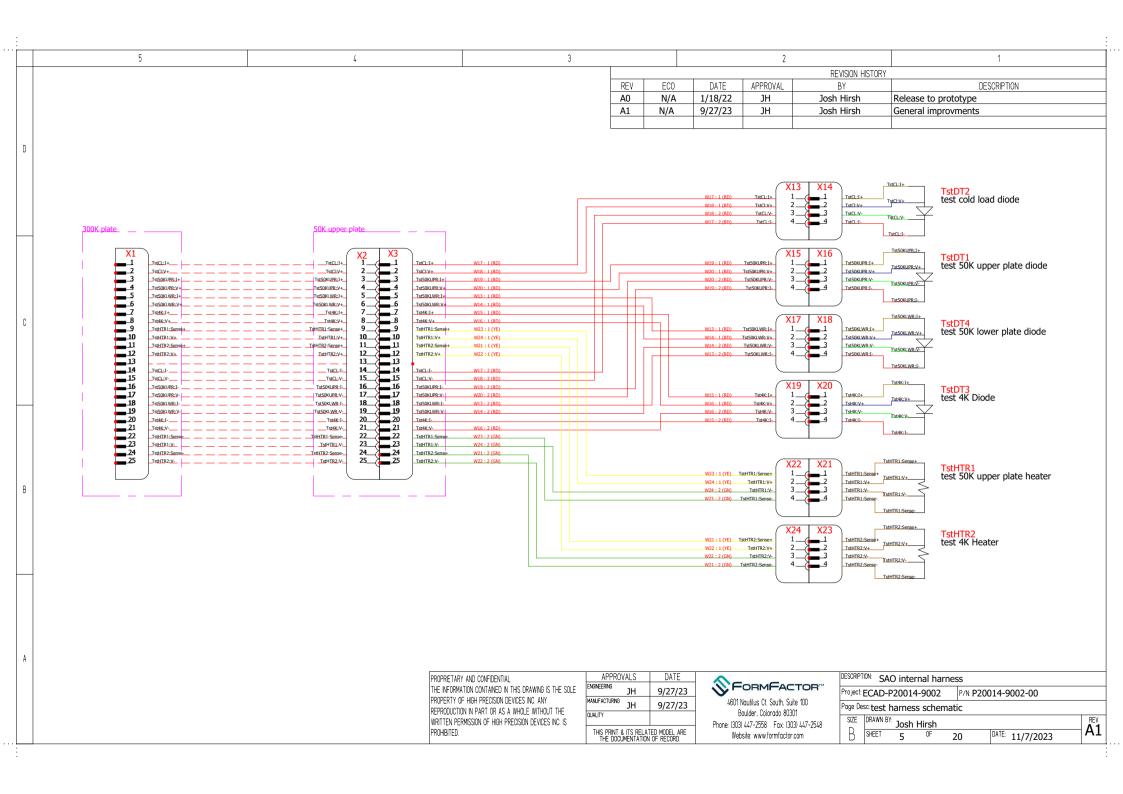
Phone: (303) 447-2558 Fax: (303) 447-2548 Website: www.formfactor.com

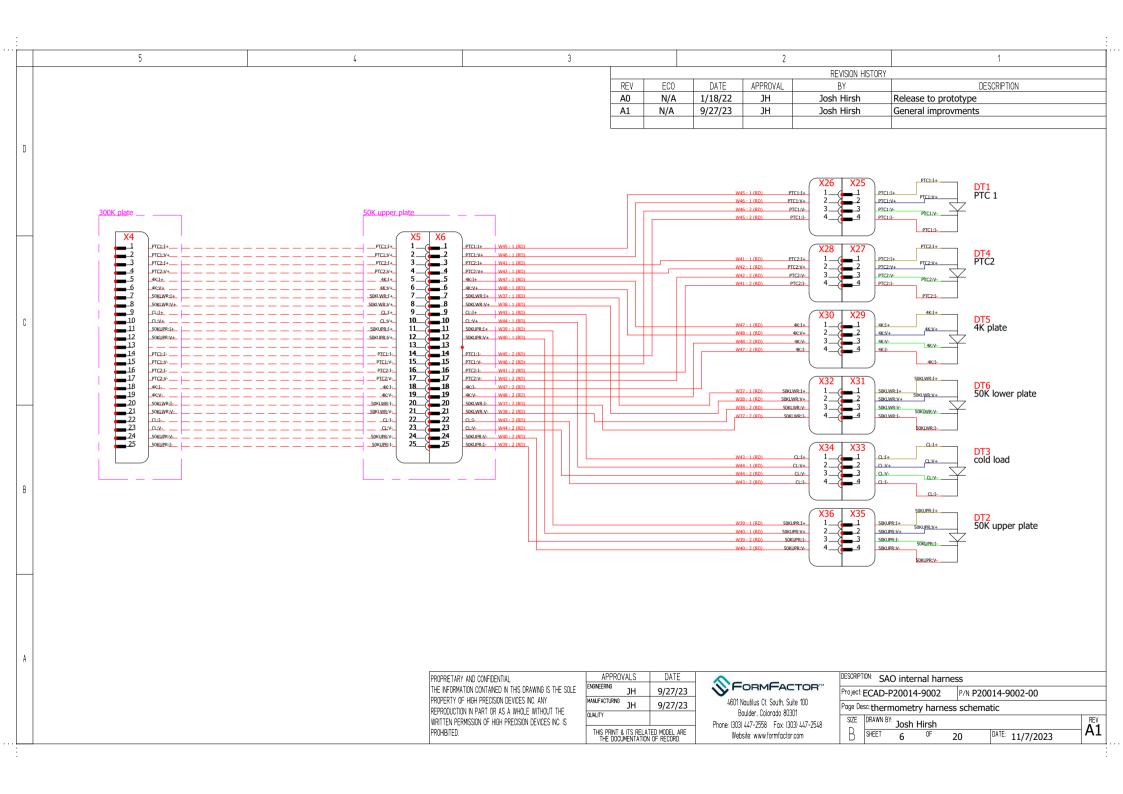
DESCRIPT	TION:	SAO ir	iternal	ha	rness				
Project:	ECAD-P2	20014	-9002		P/N: P20	014-90	002-00		
Page Des	sc: Cover	Page							
SIZE	DRAWN BY:	Josh	Hirsh						REV A 1
ΙВ	SHEET	1	0F	20)	DATE:	11/7/2023	П	ΑI

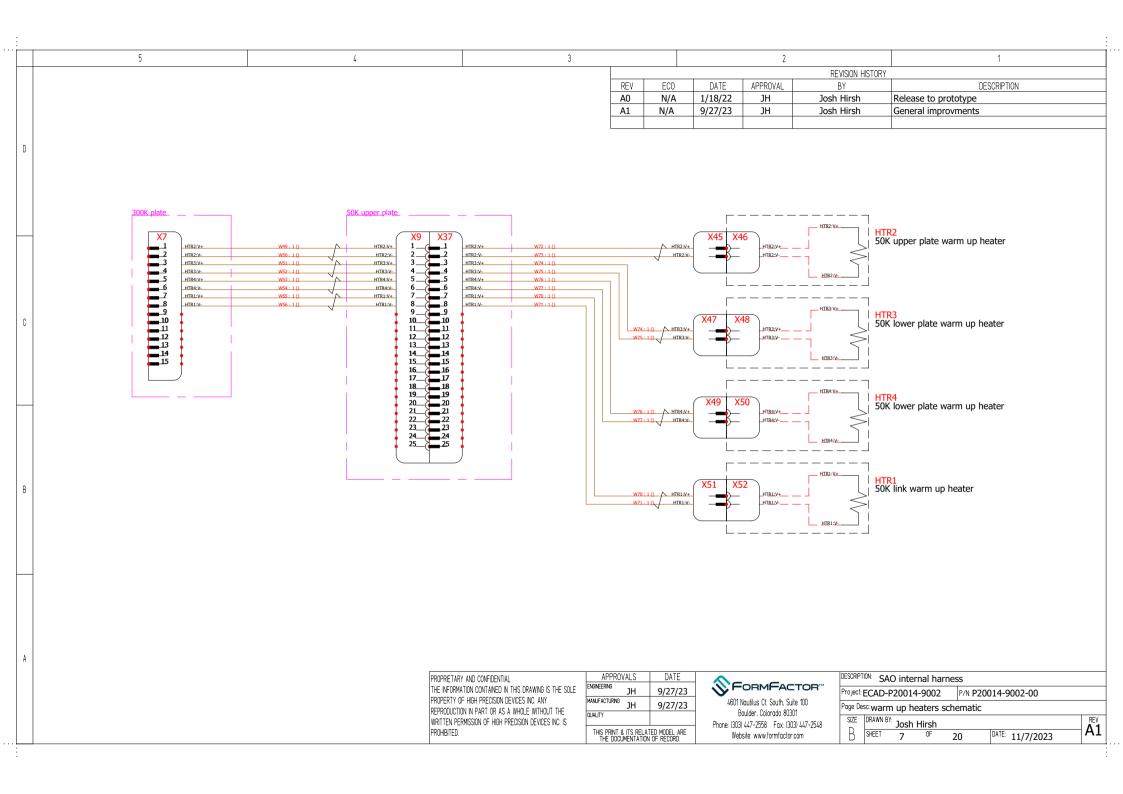


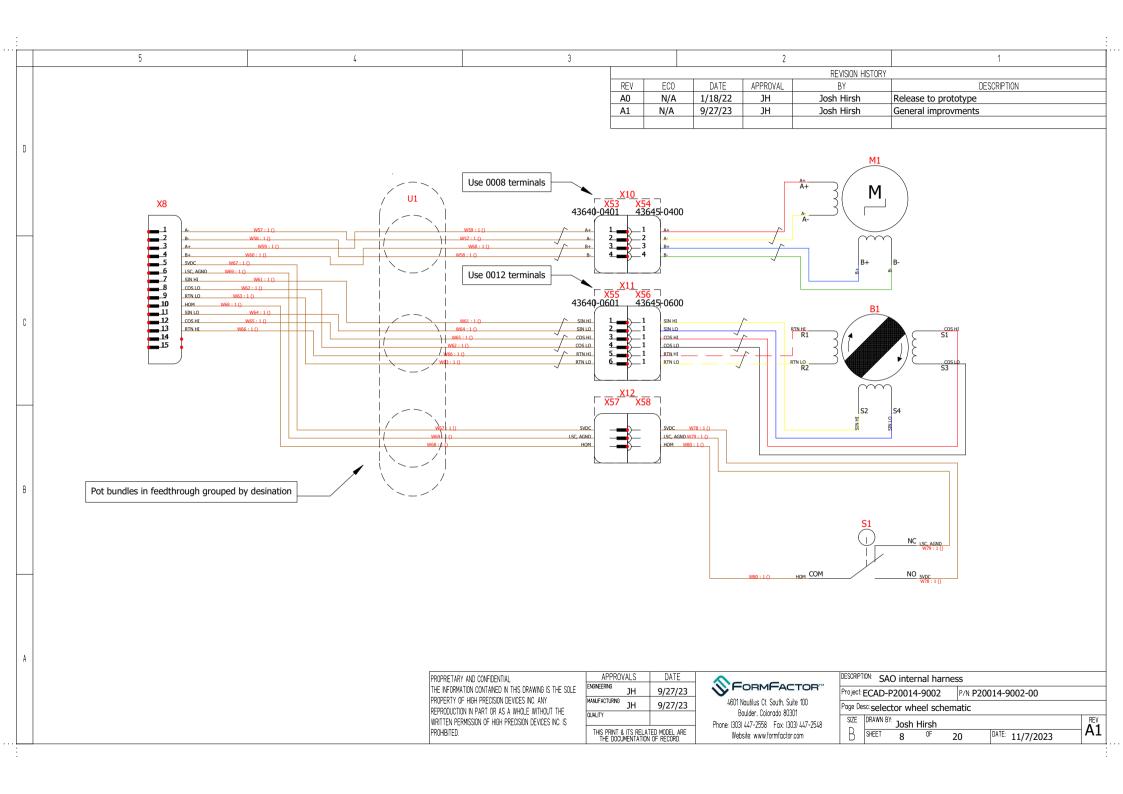




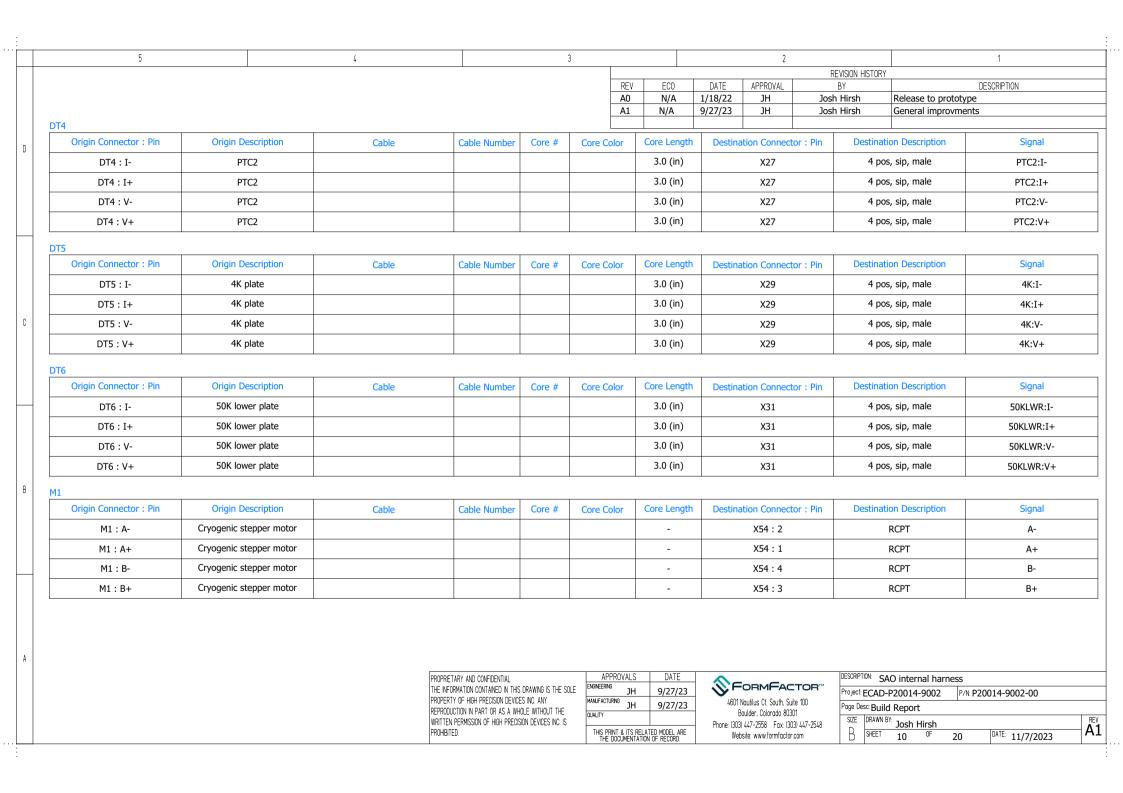






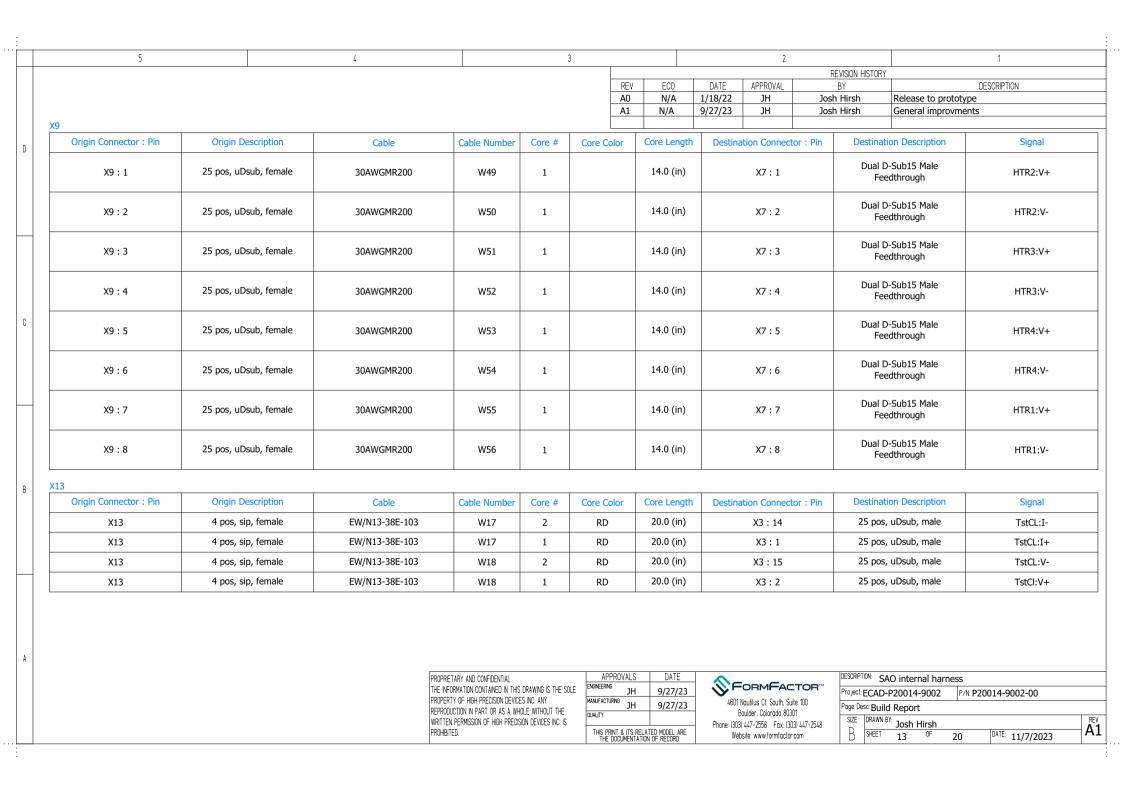


	5		4		3			2		1
						2511		DITE ADDROVA	REVISION HISTORY	DECORPTION
						REV A0	ECO N/A	DATE APPROVAL 1/18/22 JH Jo	BY Release to proto	DESCRIPTION bype
						A1	N/A		sh Hirsh General improvm	••
	B1									
D	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	B1 : R1	Resolver					-	X56 : 1	RCPT	RTN HI
	B1 : R2	Resolver					-	X56 : 1	RCPT	RTN LO
	B1 : S1	Resolver					-	X56 : 1	RCPT	COS HI
	B1 : S2	Resolver					-	X56 : 1	RCPT	SIN HI
	B1 : S3	Resolver					-	X56 : 1	RCPT	COS LO
	B1 : S4	Resolver					-	X56 : 1	RCPT	SIN LO
	DT1									
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	DT1 : I-	PTC 1					3.0 (in)	X25	4 pos, sip, male	PTC1:I-
	DT1 : I+	PTC 1					3.0 (in)	X25	4 pos, sip, male	PTC1:I+
	DT1 : V-	PTC 1					3.0 (in)	X25	4 pos, sip, male	PTC1:V-
	DT1 : V+	PTC 1					3.0 (in)	X25	4 pos, sip, male	PTC1:V+
_	DT2									
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	DT2 : I-	50K upper plate					3.0 (in)	X35	4 pos, sip, male	50KUPR:V-
	DT2 : I+	50K upper plate					3.0 (in)	X35	4 pos, sip, male	50KUPR:I+
	DT2 : V-	50K upper plate					3.0 (in)	X35	4 pos, sip, male	50KUPR:I-
	DT2 : V+	50K upper plate					3.0 (in)	X35	4 pos, sip, male	50KUPR:V+
	DT3									
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	DT3 : I-	cold load					3.0 (in)	X33	4 pos, sip, male	CL:I-
	DT3 : I+	cold load					3.0 (in)	X33	4 pos, sip, male	CL:I+
	DT3 : V-	cold load					3.0 (in)	X33	4 pos, sip, male	CL:V-
	DT3 : V+	cold load					3.0 (in)	X33	4 pos, sip, male	CL:V+
1			T P	PROPRETARY AND CONFIDENTIAL HE INFORMATION CONTAINED IN THIS PROPERTY OF HIGH PRECISION DEVICE EPPRODUCTION IN PART OR AS A WH	S INC. ANY	MANUFACTURING JH	9/27/23	FORMFACTOR TM 4601 Noutilus Ct. South, Suite 100 Boulder, Colorado 80301	Page Desc: Build Report	5 P∕N P20014-9002-00
			V	VRITTEN PERMISSION OF HIGH PRECIS		QUALITY	DELITED MOSS: 125	Phone: (303) 447-2558 Fax: (303) 447-2548	SIZE DRAWN BY: Josh Hirsh	DATE: 11/7/2023
			P	ROHBITED.		THIS PRINT & ITS F	RELATED MODEL ARE ATION OF RECORD.	Website: www.formfactor.com	B SHEET 9 OF 20	DATE: 11/7/2023



	5		4		3				2			1
								DATE	100000VAI	REVISION HISTO	<u>rory</u>	DECORIDATION
						REV A0		DATE 1/18/22	JH APPROVAL	BY Josh Hirsh	Release to prototy	DESCRIPTION type
						A1		9/27/23	JH	Josh Hirsh	General improvme	**
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	th Destina	ation Connector	r · Din Dest	tination Description	Signal
1	S1 : NO	home switch	32AWGMR200	W78	1		20.0 (in)		X58		3 pos sip rcpt	5VDC
1	S1 : NC	home switch	32AWGMR200	W78 W79	1		20.0 (in)		X58		3 pos sip rept	LSC, AGND
1	S1 : COM	home switch	32AWGMR200	W80	1		20.0 (in)		X58		3 pos sip rept	HOM
1		Home Syntan	JEANOI INCOO				2010 (,				<u> </u>	110.1
	TstDT1 Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	th Destina	ation Connector	or : Pin Dest	tination Description	Signal
	TstDT1	test 50K upper plate diode		-			-		X16		4 pos, sip, male	Tst50KUPR:I+
	TstDT1	test 50K upper plate diode		+			-		X16		4 pos, sip, male	Tst50KUPR:V+
	TstDT1	test 50K upper plate diode		+			-		X16	4	4 pos, sip, male	Tst50KUPR:V-
	TstDT1	test 50K upper plate diode		+			-		X16	4	4 pos, sip, male	Tst50KUPR:I-
	TstDT2											
1	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	.h Destina	ation Connector	r : Pin Dest	tination Description	Signal
	TstDT2	test cold load diode				·	-		X14	4	4 pos, sip, male	TstCL:I+
	TstDT2	test cold load diode					-		X14	4	4 pos, sip, male	TstCl:V+
1	TstDT2	test cold load diode					-		X14	4	4 pos, sip, male	TstCL:V-
	TstDT2	test cold load diode					-		X14	4	4 pos, sip, male	TstCL:I-
	TstDT3						<u>. </u>					
1	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	n Destinat	ation Connector	: Pin Desti	tination Description	Signal
1	TstDT3	test 4K Diode					-		X20	4	4 pos, sip, male	Tst4K:I+
1	TstDT3	test 4K Diode		'			-		X20	4	4 pos, sip, male	Tst4K:V+
	TstDT3	test 4K Diode		'	1		-		X20	4	4 pos, sip, male	Tst4K:V-
1	TstDT3	test 4K Diode					-		X20	4	4 pos, sip, male	Tst4K:I-
	TstDT4											
-	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	n Destinat	ation Connector	: Pin Desti	tination Description	Signal
1	TstDT4	test 50K lower plate diode					-		X18	4	4 pos, sip, male	Tst50KLWR:I+
				PROPRIETARY AND CONFIDENTIAL		APPROVALS		- Oc	COME	DESCRIPTION:	SAO internal harness	,
				THE INFORMATION CONTAINED IN THIS PROPERTY OF HIGH PRECISION DEVICE:		MANUFACTURAGE		100411	ORMFACT	LCr	CAD-P20014-9002 P/	P/N: P20014-9002-00
				REPRODUCTION IN PART OR AS A WHO		MANUFACTURING JH QUALITY	H 9/27/23		Nautilus Ct. South, Suite 16 Joulder, Colorado 80301	li age pest. B	Build Report	
				WRITTEN PERMISSION OF HIGH PRECISI	JION DEVICES INC. IS		C CCLATED MODEL ADD	Phone: (303) 4) 447-2558 Fax: (303) 4	17.7.7-2578 SIZE DRA	RAWN BY: Josh Hirsh	
			PKI	PROHBITED.		THE DOCUME	S RELATED MODEL ARE NTATION OF RECORD.	Webs	osite: www.formfactor.com	om B SHE	HEET 11 OF 20	DATE: 11/7/2023

	5		4		3			2		1
						DEV	T 500		REVISION HISTORY	DECODIDATION
						REV A0	ECO N/A	DATE APPROVAL 1/18/22 JH Jos	BY Release to protot	DESCRIPTION byne
						A1	N/A		sh Hirsh General improvm	• • • • • • • • • • • • • • • • • • • •
	-> TstDT4									
	Origin Connector : Pin	Origin Desc	cription Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	TstDT4	test 50K lower	plate diode				-	X18	4 pos, sip, male	Tst50KLWR:V+
	TstDT4	test 50K lower	plate diode				-	X18	4 pos, sip, male	Tst50KLWR:V-
	TstDT4	test 50K lower	plate diode				-	X18	4 pos, sip, male	Tst50KLWR:I-
	TstHTR2									
	Origin Connector : Pin	Origin Desc	cription Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	TstHTR2	test 4K H	eater				-	X23	4 pos, sip, male	TstHTR2:Sense+
	TstHTR2	test 4K H	eater				-	X23	4 pos, sip, male	TstHTR2:V+
	TstHTR2	test 4K H	eater				-	X23	4 pos, sip, male	TstHTR2:V-
	TstHTR2	test 4K H	eater				-	X23	4 pos, sip, male	TstHTR2:Sense-
	X6									
	Origin Connector : Pin	Origin Desc	cription Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X6 : 3	25 pos, uDsu	ub, male EW/N13-38E-103	W41	1	RD	20.0 (in)	X28	4 pos, sip, female	PTC2:I+
+	X6:16	25 pos, uDsu	ub, male EW/N13-38E-103	W41	2	RD	20.0 (in)	X28	4 pos, sip, female	PTC2:I-
	X6 : 4	25 pos, uDsu	ub, male EW/N13-38E-103	W42	1	RD	20.0 (in)	X28	4 pos, sip, female	PTC2:V+
	X6:17	25 pos, uDsu	ub, male EW/N13-38E-103	W42	2	RD	20.0 (in)	X28	4 pos, sip, female	PTC2:V-
	X6:1	25 pos, uDsu	ub, male EW/N13-38E-103	W45	1	RD	16.0 (in)	X26	4 pos, sip, female	PTC1:I+
	X6:14	25 pos, uDsu	ub, male EW/N13-38E-103	W45	2	RD	16.0 (in)	X26	4 pos, sip, female	PTC1:I-
	X6:2	25 pos, uDsu	ub, male EW/N13-38E-103	W46	1	RD	16.0 (in)	X26	4 pos, sip, female	PTC1:V+
	X6 : 15	25 pos, uDsu	ub, male EW/N13-38E-103	W46	2	RD	16.0 (in)	X26	4 pos, sip, female	PTC1:V-
	X6 : 5	25 pos, uDsu	ub, male EW/N13-38E-103	W47	1	RD	31.0 (in)	X30	4 pos, sip, female	4K:I+
	X6:18	25 pos, uDsu	ub, male EW/N13-38E-103	W47	2	RD	31.0 (in)	X30	4 pos, sip, female	4K:I-
	X6 : 6	25 pos, uDsu	ub, male EW/N13-38E-103	W48	1	RD	31.0 (in)	X30	4 pos, sip, female	4K:V+
	X6:19	25 pos, uDsu	ub, male EW/N13-38E-103	W48	2	RD	31.0 (in)	X30	4 pos, sip, female	4K:V-
A		-	·	W48 PROPRIETARY AND CONFIDENTIAL	2	RD APPROVALS	31.0 (in)			2
				THE INFORMATION CONTAINED IN THIS PROPERTY OF HIGH PRECISION DEVICE		MANUEL OT UDAYO	9/27/23	4601 Noutilus Ct. South, Suite 100		P/N: P20014-9002-00
				REPRODUCTION IN PART OR AS A WH	IOLE WITHOUT THE	QUALITY JH	9/27/23	Boulder, Colorado 80301	Page Desc: Build Report	1.
				WRITTEN PERMISSION OF HIGH PRECIS PROHIBITED.	SION DEVICES INC. IS		ELATED MODEL ARE TION OF RECORD.	Phone: (303) 447-2558 Fax: (303) 447-2548 Website: www.formfactor.com	SIZE DRAWN BY: Josh Hirsh SHEET 12 OF 20	DATE: 11/7/2023
						THE DOCUMENTA	TION OF RECORD.	website, www.formidctor.com	B SHEET 12 OF 20	11///2023

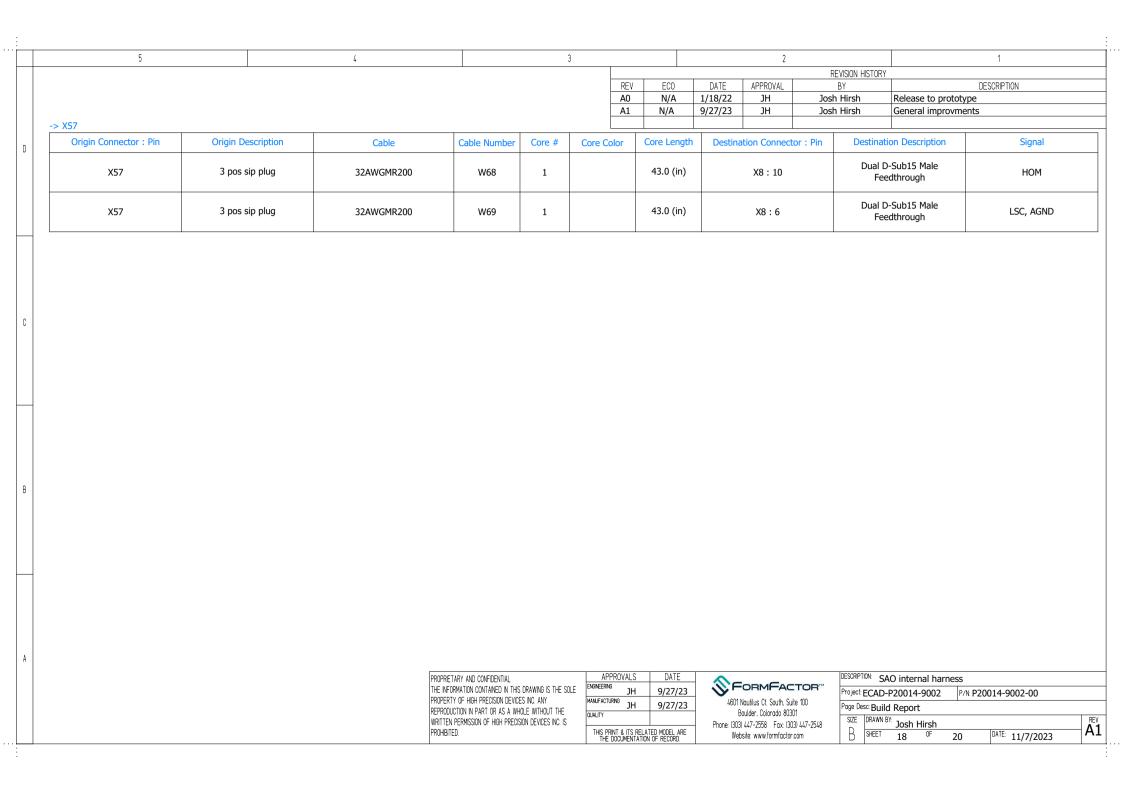


:												
		5		4		3			2		1	
							-			REVISION HISTORY		
							REV A0	ECO N/A	DATE APPROVAL 1/18/22 JH Jos	h Hirsh Release to proto	DESCRIPTION	
							A1			h Hirsh General improvm	• • • • • • • • • • • • • • • • • • • •	
)	X15										
D		Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal	
		X15	4 pos, sip, female	EW/N13-38E-103	W19	2	RD	20.0 (in)	X3 : 16	25 pos, uDsub, male	Tst50KUPR:I-	
		X15	4 pos, sip, female	EW/N13-38E-103	W19	1	RD	20.0 (in)	X3:3	25 pos, uDsub, male	Tst50KUPR:I+	
		X15	4 pos, sip, female	EW/N13-38E-103	W20	2	RD	20.0 (in)	X3 : 17	25 pos, uDsub, male	Tst50KUPR:V-	
		X15	4 pos, sip, female	EW/N13-38E-103	W20	1	RD	20.0 (in)	X3 : 4	25 pos, uDsub, male	Tst50KUPR:V+	
	,	X17										
		Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal	
		X17	4 pos, sip, female	EW/N13-38E-103	W13	2	RD	36.0 (in)	X3 : 18	25 pos, uDsub, male	Tst50KLWR:I-	
		X17	4 pos, sip, female	EW/N13-38E-103	W13	1	RD	36.0 (in)	X3 : 5	25 pos, uDsub, male	Tst50KLWR:I+	
C		X17	4 pos, sip, female	EW/N13-38E-103	W14	1	RD	36.0 (in)	X3 : 6	25 pos, uDsub, male	Tst50KLWR:V+	
		X17	4 pos, sip, female	EW/N13-38E-103	W14	2	RD	36.0 (in)	X3 : 19	25 pos, uDsub, male	Tst50KLWR:V-	
		X19										
	[Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal	
	1	X19	4 pos, sip, female	EW/N13-38E-103	W15	2	RD	24.0 (in)	X3:20	25 pos, uDsub, male	Tst4K:I-	
		X19	4 pos, sip, female	EW/N13-38E-103	W15	1	RD	24.0 (in)	X3 : 7	25 pos, uDsub, male	Tst4K:I+	
		X19	4 pos, sip, female	EW/N13-38E-103	W16	2	RD	24.0 (in)	X3 : 21	25 pos, uDsub, male	Tst4K:V-	
		X19	4 pos, sip, female	EW/N13-38E-103	W16	1	RD	24.0 (in)	X3:8	25 pos, uDsub, male	Tst4K:V+	
В												
		Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal	
		X21	4 pos, sip, male					-	TstHTR1	test 50K upper plate heater	TstHTR1:Sense+	
		X21	4 pos, sip, male					-	TstHTR1	test 50K upper plate heater	TstHTR1:V+	
		X21	4 pos, sip, male					-	TstHTR1	test 50K upper plate heater	TstHTR1:V-	
		X21	4 pos, sip, male					-	TstHTR1	test 50K upper plate heater	TstHTR1:Sense-	
			l l				ı					
A				_						T		
					IPRIETARY AND CONFIDENTIAL E INFORMATION CONTAINED IN THIS	C DRAWING IC THE COL	ENGINEERING JH		 FORMFACTOR™	DESCRIPTION: SAO internal harness		
					: INFORMATION CONTAINED IN THIS DPERTY OF HIGH PRECISION DEVICE		MANUFACTURING JH		4601 Nautilus Ct. South, Suite 100		P/N: P20014-9002-00	
				REF	PRODUCTION IN PART OR AS A WH	HOLE WITHOUT THE	QUALITY	9/27/23	Boulder, Colorado 80301	Page Desc: Build Report		חריי
					ITTEN PERMISSION OF HIGH PRECIS DHIBITED.	SIUN DEVICES INC. IS	THIS PRINT & ITS F	RELATED MODEL ARE ATION OF RECORD.	Phone: (303) 447-2558 Fax: (303) 447-2548 Website: www.formfactor.com	SIZE DRAWN BY: Josh Hirsh SHEET 14 OF 20	DATE: 11/7/2023	A1
							THE DOCUMENT	ATION OF RECORD.	HOUSIG. WWW.IOTHIQUID.COM	10 14 20	, 11///2023	

	5		4		3			2		1
									REVISION HISTORY	
						REV A0	ECO N/A	DATE APPROVAL 1/18/22 JH Jos	BY h Hirsh Release to protot	DESCRIPTION
						A1	N/A		h Hirsh General improvm	• •
	X22									
D	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X22	4 pos, sip, female	WDT-32-500	W23	2	GN	20.0 (in)	X3 : 22	25 pos, uDsub, male	TstHTR1:Sense-
	X22	4 pos, sip, female	WDT-32-500	W23	1	YE	20.0 (in)	X3:9	25 pos, uDsub, male	TstHTR1:Sense+
	X22	4 pos, sip, female	WDT-32-500	W24	2	GN	20.0 (in)	X3 : 23	25 pos, uDsub, male	TstHTR1:V-
	X22	4 pos, sip, female	WDT-32-500	W24	1	YE	20.0 (in)	X3 : 10	25 pos, uDsub, male	TstHTR1:V+
٦	X24									
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X24	4 pos, sip, female	WDT-32-500	W21	2	GN	24.0 (in)	X3 : 24	25 pos, uDsub, male	TstHTR2:Sense-
	X24	4 pos, sip, female	WDT-32-500	W21	1	YE	24.0 (in)	X3:11	25 pos, uDsub, male	TstHTR2:Sense+
C	X24	4 pos, sip, female	WDT-32-500	W22	2	GN	24.0 (in)	X3 : 25	25 pos, uDsub, male	TstHTR2:V-
	X24	4 pos, sip, female	WDT-32-500	W22	1	YE	24.0 (in)	X3 : 12	25 pos, uDsub, male	TstHTR2:V+
	X32									
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
4	X32	4 pos, sip, female	EW/N13-38E-103	W37	2	RD	32.0 (in)	X6:20	25 pos, uDsub, male	50KLWR:I-
	X32	4 pos, sip, female	EW/N13-38E-103	W37	1	RD	32.0 (in)	X6:7	25 pos, uDsub, male	50KLWR:I+
	X32	4 pos, sip, female	EW/N13-38E-103	W38	2	RD	32.0 (in)	X6 : 21	25 pos, uDsub, male	50KLWR:V-
	X32	4 pos, sip, female	EW/N13-38E-103	W38	1	RD	32.0 (in)	X6:8	25 pos, uDsub, male	50KLWR:V+
,	X34			,		'				
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X34	4 pos, sip, female	EW/N13-38E-103	W43	2	RD	16.0 (in)	X6:22	25 pos, uDsub, male	CL:I-
	X34	4 pos, sip, female	EW/N13-38E-103	W43	1	RD	16.0 (in)	X6:9	25 pos, uDsub, male	CL:I+
	X34	4 pos, sip, female	EW/N13-38E-103	W44	2	RD	16.0 (in)	X6:23	25 pos, uDsub, male	CL:V-
	X34	4 pos, sip, female	EW/N13-38E-103	W44	1	RD	16.0 (in)	X6:10	25 pos, uDsub, male	CL:V+
A										
`			F	PROPRIETARY AND CONFIDENTIAL		APPROVALS	DATE	^	DESCRIPTION: SAO internal harness	3
			ī	THE INFORMATION CONTAINED IN THIS		5	9/27/23	© FORMFACTOR™		P/N: P20014-9002-00
				PROPERTY OF HIGH PRECISION DEVIC REPRODUCTION IN PART OR AS A WH		MANUFACTURNG JH	9/27/23	4601 Nautilus Ct. South, Suite 100 Boulder, Colorado 80301	Page Desc: Build Report	
			l v	WRITTEN PERMISSION OF HIGH PRECIS		QUALITY	E 1750 1055 :	Phone: (303) 447-2558 Fax: (303) 447-2548	SIZE DRAWN BY: Josh Hirsh	
			F	PROHBITED.		THIS PRINT & ITS R	ELATED MODEL ARE ATION OF RECORD.	Website: www.formfactor.com	B SHEET 15 OF 20	DATE: 11/7/2023

	5		4			3				2			1	
											REVISION H	HSTORY		
						-	REV	ECO		APPROVAL	BY	D.I I I	DESCRIPTION	
							A0 A1		1/18/22 9/27/23	JH JH	Josh Hirsh Josh Hirsh	Release to prot		
	X36						AI	N/A	9/2//23	JΠ	JOSH HIISH	General improv	mens	
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo	r C	Core Length	Destination	on Connecto	r : Pin De	estination Description	Signal	_
	X36	4 pos, sip, female	EW/N13-38E-103	W39	2	RD		22.0 (in)		X6:25	2	5 pos, uDsub, male	50KUPR:I-	
	X36	4 pos, sip, female	EW/N13-38E-103	W39	1	RD		22.0 (in)		X6:11	2	5 pos, uDsub, male	50KUPR:I+	
	X36	4 pos, sip, female	EW/N13-38E-103	W40	2	RD		22.0 (in)		X6:24	2	5 pos, uDsub, male	50KUPR:V-	
	X36	4 pos, sip, female	EW/N13-38E-103	W40	1	RD		22.0 (in)		X6:12	2	5 pos, uDsub, male	50KUPR:V+	
	X45													
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo	r C	Core Length	Destination	on Connecto	r : Pin De	estination Description	Signal	
	X45	2 Pos SIP, PLUG	30AWGMR200	W72	1			20.0 (in)		X37 : 1	2	5 pos, uDsub, male	HTR2:V+	
	X45	2 Pos SIP, PLUG	30AWGMR200	W73	1			20.0 (in)		X37:2	2	5 pos, uDsub, male	HTR2:V-	
	X47								_					
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo	r C	Core Length	Destination	on Connecto	r : Pin De	estination Description	Signal	
	X47	2 Pos SIP, PLUG	30AWGMR200	W74	1			-		X37 : 3	2	5 pos, uDsub, male	HTR3:V+	
	X47	2 Pos SIP, PLUG	30AWGMR200	W75	1			-		X37 : 4	2	5 pos, uDsub, male	HTR3:V-	
1	X49								T					
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo	r C	Core Length	Destination	on Connecto	r : Pin De	estination Description	Signal	
	X49	2 Pos SIP, PLUG	30AWGMR200	W76	1			-		X37 : 5	2	5 pos, uDsub, male	HTR4:V+	
	X49	2 Pos SIP, PLUG	30AWGMR200	W77	1			-		X37 : 6	2	5 pos, uDsub, male	HTR4:V-	
	X51					1					1			
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo		Core Length	Destination	on Connecto		estination Description	Signal	
	X51	2 Pos SIP, PLUG	30AWGMR200	W70	1			20.0 (in)		X37 : 7	2	5 pos, uDsub, male	HTR1:V+	
	X51	2 Pos SIP, PLUG	30AWGMR200	W71	1			20.0 (in)		X37 : 8	2	5 pos, uDsub, male	HTR1:V-	
1	X53										1			
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Colo	r C	Core Length	Destination	on Connecto	r : Pin De	estination Description	Signal	
	X53 : 2	PLUG		W57	1			43.0 (in)		X8:1	1	Dual D-Sub15 Male Feedthrough	Α-	
				PROPRIETARY AND CONFIDENTIAL		APPRO	OVALS	DATE	^		DESCRIPT	ION: SAO internal harne	ess	
				THE INFORMATION CONTAINED IN THIS			JH	9/27/23		RMFACT	ror™ Project:	ECAD-P20014-9002	P/N: P20014-9002-00	
				PROPERTY OF HIGH PRECISION DEVICE REPRODUCTION IN PART OR AS A WH		MANUFACTURING	JH	9/27/23		tilus Ct. South, Suite	100 Page De	sc Build Report	1 11 11	
				WRITTEN PERMISSION OF HIGH PRECIS		QUALITY				der, Colorado 80301 7-2558 Fax: (303)	/./.7-25/.8 SIZE	DRAWN BY: Josh Hirsh		
				PROHBITED.			& ITS RELAT	TED MODEL ARE I OF RECORD.		e: www.formfactor.co	m B	SHEET 16 OF 2	20 DATE: 11/7/2023	

	5		4		3			2		1
						REV	EC0	DATE APPROVAL	REVISION HISTORY BY	DESCRIPTION
						A0	N/A		sh Hirsh Release to proto	
						A1	N/A		sh Hirsh General improvi	
	-> X53						,			
D	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X53 : 4	PLUG		W58	1		43.0 (in)	X8:2	Dual D-Sub15 Male Feedthrough	В-
	X53 : 1	PLUG		W59	1		43.0 (in)	X8:3	Dual D-Sub15 Male Feedthrough	A+
	X53 : 3	PLUG		W60	1		43.0 (in)	X8 : 4	Dual D-Sub15 Male Feedthrough	B+
	X55			<u> </u>		1				
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
C	X55 : 1	PLUG	26AWGMR200	W61	1		43.0 (in)	X8 : 7	Dual D-Sub15 Male Feedthrough	SIN HI
	X55 : 4	PLUG	26AWGMR200	W62	1		43.0 (in)	X8:8	Dual D-Sub15 Male Feedthrough	COS LO
	X55 : 6	PLUG	26AWGMR200	W63	1		43.0 (in)	X8 : 9	Dual D-Sub15 Male Feedthrough	RTN LO
	X55 : 2	PLUG	26AWGMR200	W64	1		43.0 (in)	X8:11	Dual D-Sub15 Male Feedthrough	SIN LO
В	X55 : 3	PLUG	26AWGMR200	W65	1		43.0 (in)	X8:12	Dual D-Sub15 Male Feedthrough	COS HI
	X55 : 5	PLUG	26AWGMR200	W66	1		43.0 (in)	X8:13	Dual D-Sub15 Male Feedthrough	RTN HI
	X57			1		1				
	Origin Connector : Pin	Origin Description	Cable	Cable Number	Core #	Core Color	Core Length	Destination Connector : Pin	Destination Description	Signal
	X57	3 pos sip plug	32AWGMR200	W67	1		43.0 (in)	X8 : 5	Dual D-Sub15 Male Feedthrough	5VDC
A										
			F	PROPRIETARY AND CONFIDENTIAL		APPROVALS	DATE	N c	DESCRIPTION: SAO internal harnes	SS
				THE INFORMATION CONTAINED IN THIS		E ENGINEERING JH	9/27/23	S FORMFACTOR™	Project: ECAD-P20014-9002	P/N: P20014-9002-00
				PROPERTY OF HIGH PRECISION DEVIC REPRODUCTION IN PART OR AS A WH		MANUFACTURING JH	9/27/23	4601 Nautilus Ct. South, Suite 100 Boulder, Colorado 80301	Page Desc: Build Report	
			\	WRITTEN PERMISSION OF HIGH PRECIS		QUALITY		Phone: (303) 447-2558 Fax: (303) 447-2548	SIZE DRAWN BY: Josh Hirsh	0 DATE: 11/7/2023
			F	PROHBITED.		THIS PRINT & ITS R	RELATED MODEL ARE ATION OF RECORD.	Website: www.formfactor.com	B SHEET 17 OF 2	0 DATE: 11/7/2023 A



5 3 2 REVISION HISTORY REV EC0 DATE APPROVAL BY DESCRIPTION Α0 N/A 1/18/22 JH Josh Hirsh Release to prototype

A1

N/A

9/27/23

JH

Josh Hirsh

P20014-9002-00 - SAO internal harness

	P20014	<u>-9002-00 - SAO i</u>	nternal harness			
		Tag	Manufacturer	Part Number	Qty	Description
	1	DT4, DT6, TstDT3	Lake Shore Cryotronics	DT-670B-CU	3	Silicon diode temperature sensor
	2	TstHTR2, HTR1, HTR3, HTR4	High Precision Devices	p08015-405-0	4	Heater, 50 W
	3	TstDT4	Lake Shore Cryotronics	DT-670B-CU	1	Silicon diode temperature sensor
	4	B1	Admotec	RO3620	1	Size 15 solid-rotor resolver
	5	DT1, DT2, DT3, DT5	Lake Shore Cryotronics	DT-670B-CU	4	Silicon diode temperature sensor
	6	HTR2	High Precision Devices	p08015-405-0	1	Heater, 50 W
	7	M1	Phytron	VSS_57.200.2.5-UHVC	1	Cryogenic stepper motor
4	8	S1	Honeywell	111SM23-T	1	Pressure switch
	9	TstDT1, TstDT2	Lake Shore Cryotronics	DT-670B-CU	2	Silicon diode temperature sensor
	10	TstHTR1	High Precision Devices	p08015-405-0	1	Heater, 50 W
	11	U1	High Precision Devices	P04102-170-20	1	Oval Insert, Cu/Au, 3X 1/4-20
	12	X2	Glenair	M83513/02-DC	1	25s u-D, Female
	13	X3	Glenair	M83513/01-DC	1	25p u-D, Male
	14	X5	Glenair	M83513/02-DC	1	25s u-D, Female
	15	X6	Glenair	M83513/01-DC	1	25p u-D, Male
	16	Х9	Glenair	M83513/02-DC	1	25s u-D, Female
- 1						

	APPROV	/ALS	DATE
OLE	ENGINEERING	JH	9/27/23
	MANUFACTURING	JH	9/27/23
	QUALITY		
	THIS PRINT & THE DOCU	ITS RELAT	ED MODEL ARE OF RECORD.

7/23 '/23 Phone: (303)

Nautilus Ct. South, Suite 100	
Boulder, Colorado 80301	
3) 447-2558 Fax: (303) 447-2548	
bsite: www.formfactor.com	

DESCRIPTI	^{ION:} SA	O inter	nal har	ness			
Project:	ECAD-F	20014	-9002	P/N:	P20014-9	9002-00	
Page Des	sc: BOM						
SIZE	DRAWN BY	Josh	Hirsh				REV A 1
ΙВ	SHEET	19	0F	20	DATE:	11/7/2023	ΑT

General improvments

PROPRETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOL PROPERTY OF HIGH PRECISION DEVICES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF HIGH PRECISION DEVICES INC. IS
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOL
PROPERTY OF HIGH PRECISION DEVICES INC. ANY
REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE
WRITTEN PERMISSION OF HIGH PRECISION DEVICES INC. IS
PROHBITED.

5 2 REVISION HISTORY REV EC0 DATE APPROVAL BY DESCRIPTION 1/18/22 A0 JH N/A Josh Hirsh Release to prototype A1 N/A 9/27/23 JH General improvments Josh Hirsh

-> P20014-9002-00 - SAO internal harness							
	Tag	Manufacturer	Part Number	Qty	Description		
17	X10 X53, X10 X53, X10 X53, X10 X53	Molex	43031-0008	4	Micro-Fit 3.0 Crimp Terminal, Male, with 0.38µm Select Gold (Au) Plated Phosphor Bronze Contact, 20-24 AWG, Bag		
18	X10 X53	Molex	43640-0401	1	Micro-Fit 3.0 Plug Housing, Single Row, 4 Circuits, UL 94V-0, Low-Halogen, Black		
19	X10 X54, X10 X54, X10 X54, X10 X54	Molex	43030-0008	4	Micro-Fit 3.0 Crimp Terminal, Female, with Select Gold (Au) Plated Phosphor Bronze Contact, 20-24 AWG, Bag		
20	X10 X54	Molex	43645-0400	1	Micro-Fit 3.0 Receptacle Housing, Single Row 4 Circuits, UL 94V-0, Black		
21	X11 X55	Molex	43640-0601	1	Micro-Fit 3.0 Plug Housing, Single Row, 6 Circuits, UL 94V-0, Low-Halogen, Black		
22	X11 X55, X11 X55, X11 X55, X11 X55, X11 X55, X11 X55	Molex	430310012	6	Micro-Fit 3.0 Crimp Terminal, Male, with 0.76µm Select Gold (Au) Plated Phosphor Bronze Contact, 26-30 AWG, Bag		
23	X11 X56	Molex	43645-0600	1	Micro-Fit 3.0 Receptacle Housing, Single Row, 6 Circuits, UL 94V-0, Black		
24	X11 X56, X11 X56, X11 X56, X11 X56, X11 X56, X11 X56	Molex	430300012	6	Micro-Fit 3.0 Crimp Terminal, Female, with Select Gold (Au) Plated Phosphor Bronze Contact, 26-30 AWG, Bag		
25	X37	Glenair	M83513/01-DC	1	25p u-D, Male		
26	Port 1	High Precision Devices	P04102-449-2	1	Dual D-Sub25 Male Feedthrough		

P04102-418-0

27

Port 2

HPD

PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF HIGH PRECISION DEVICES INC. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF HIGH PRECISION DEVICES INC. IS
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE
PROPERTY OF HIGH PRECISION DEVICES INC. ANY
REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE
WRITTEN PERMISSION OF HIGH PRECISION DEVICES INC. IS
PROHBITED.

Asm, NW Multi-Pin Feedthrough, Dual 15,

NW50

	APPRO\	DATE			
E	ENGINEERING	JH	9/27/23		
	MANUFACTURING	JH	9/27/23		
	QUALITY				
	THIS PRINT & ITS RELATED MODEL ARE THE DOCUMENTATION OF RECORD.				

FORMFACTOR™
4601 Nautilus Ct. South. Suite 100
Boulder, Colorado 80301
Phone: G031 447-2558 Fox: G031 447-2548
Websile: www.formfactor.com

DESCRIPTION: SAO internal harness								
Project: ECAD-P20014-9002				P/N: F	P/N: P20014-9002-00			
Page Desc: BOM								
SIZE DRAWN BY: Josh Hirsh								REV A 1
ΙВ	SHEET	20	0F	20	DATE:	11/7/2023		ΑI