Danaher Precision Systems

Specifications and Final Inspection Report 100 Series Controllers

Order Information	•	Ω	COMPFIR100.DOC Rev. 1
Sales Order No. 20611 621	The second of th	Cothyludsey	Part No. // 32363 #12
eck List		Certified Rv:	Carrier Services
Feature:	Acceptable	1	
Anodizing	1	1	
Scratches	Ĺ		
Unit Settings:		Certified By:	S
Parameter	Specification/Setting	etting	
Input Voltage	Tested at: 115VAC (V) Shipped at: 1/5 VA	VAC M 230VAC M	S
Drive Module Type		ĕ١	5 Other
Check Remote Clock Speed	X	UZ ()T ()U	
Response		3	
Check Switch Step	(NX XV)	$\mathcal{O}(\mathbf{z})$ $\mathbf{T}(\mathbf{z})$	V()V
Check Switch Direction	(VX CVY)	(JZ) ()T ()U	()V
Check Switch Idle	()X ()X ((YZ ()T ()U	()V
(101 & 102) Supply #1	+ 28 VDC	+ 56 XBC	20.10
(103 & 104) Supply # 2		(A)	20000
(105 & 106) Supply #3	()		
Pre Run-in Testing:	1	Certified By:_	CR
Axis	Micrø Stepper	Motor Current	t Idle Current
X	(y)	(0) 1.45 A	124
Y	(Y)	1.45	4251 X
Z	R	(4) 1.50 A	アナシー
T	()		
U			
V			
Fan Operation	(Properly Functioning	nctioning	
System Test	(\)Complete		
Post Run-in Testing:	2	Certified By:_	Ce
Run-in to be 8 Hr. min. (Run-In Time, Date) IN 5 (10 OUT) 11 1/2/22	ne,Date) INS 1840	OUT In 1/24 H	HR's /4
Parameter	Specification/Setting	tting	
Check Remote Input Clock Speed	(yx (yx)	UZ ()T ()U	()V
Kesponse			
Check Switch Step	(C)	()T (()V
Check Switch Direction	(OX UX N	∇Z ()T ()U	V(x)

~		\smile	

New England Affiliated Technologies Specifications and Final Inspection Report 100 Series Controllers

	unctioning	(Properly F	Fan Operation
r ()U ()V		(3x) (2x)	Check Switch Idle
Certified By:	Certif		Post Run-in Testing:

itch 3	Dip Switch Settings As Shipped (On/Off): Certified By:_	y: Or	
11.5	Switch 3 Switch 4	Nation 5 Switch 5	Switch 6
X OT OTT OTT	aff ca	410	J.to
Y ON Off off	085 02	2 058	436
5 00 018 off	010 PGO	053	OSF
T			
U			
V			



Effective Date: 2/11/02

Doc# 1040364

Rev: 5 Page 1 of 2

CUSTOMER UNIVERSITY OF CALIFORNIA	PART NO. 14 1911	MODEL: FM-400 W/ BRAKE
	12-0923	
SALES ORDER NO. 20611031	WORK ORDER NO.20611031.1	
COMMERCIAL or PRECISION	SERIAL NO.58287	

WAY CHARACTERISTICS:					PERFORMED BY:JIM M	
	SPE	CIFICATION	SPECIFICATION - BY STAGE SIZE	SIZE		
TAXAMETEX	400	600	800	1200	LOWER AXIS	OPPER AXIS
	4	6	8	12	3	
FLATNESS (um)						
	4	6	8	12	4	
STRAIGHTNESS (um)						
	4	6	8	12	သ	
PITCH (arc-seconds)						
	4	о	8	12	5	
YAW (arc-seconds)						
		Commercial:	Commercial: <= 50 arc-sec		N/A	
ORTHOGANALITY (arc-sec)	F	recision: <=	Precision: <= 20 arc-seconds	S		

ORTHOGANALITY CALC	ORTHOGANALITY CALCULATIONS (IF APPLICABLE)		PERFORMED BY:N/A	P
		NOLL	NULL AXIS	
TEST AXIS	+	CENTER	9	MAX. CHANGE
+				
CENTER				
-				

Linear Error: (Max change +) plus (Max change -)
Orthoganality = 200,000 x Linear Error / travel =

SCREW CHARACTERISTICS:

PERFORMED BY:

arc-sec

00.11.10.10.10.10.10.10.10.10.10.10.10.1						
PARAMETER		SPECIFICATIO	SPECIFICATION - BY STAGE SIZE	111		
	400	600	800	1200	LOWER	UPPER
Bidirectional Repeatability (um)	3	သ	3	သ	SEE LASER	
Accuracy (um)*	8	12	16	24	TEST	
 If system has an encoder, leave this section blank and complete positional accuracy portion for encoder on page 2 	ave this section	on blank and comp	lete positional accur	acy portion for en	coder on page 2	

Minus End	Screw Torque Center	Plus End		PARAMETER
4 – 8 oz-in	4 – 8 oz-in	4 – 8 oz-in	.5 inch	SPECIFICATION - BY SCREW DIA.
8 – 12 oz-in	8 – 12 oz-in	8 – 12 oz-in	.75 inch	CREW DIA.
12	12	12		LOWER
				UPPER

TRAVEL LIMIT DATA

PERFORMED BY:

	1.021	Nominal Travel015"035"	Travel to limit - direction
	1.027	Nominal Travel + .015"035"	Travel to limit + direction
	1.286	Nominal Travel06" (minimum)	Mechanical travel - direction
	1.329	Nominal Travel + .06" (minimum)	Mechanical travel + direction
UPPER AXIS	LOWER AXIS	SPECIFICATION – ALL STAGES	PARAMETER



Effective Date: 2/11/02

Rev: 5 Doc# 1040364 of 2

Page 2

VELOCITY TESTS (tests performed over full travel in both + and - directions with payload) PERFORMED BY:

				completed	COLD START
No	Yes	No	Yes		
				completed	8 HOUR RUN
No	Yes	No	Yes		
				inches per sec^2	MAXIMUM ACCELERATION
			100000		
				inches per second	MAXIMUM VELOCITY
			30000		
				inches per second	INITIAL VELOCITY
			4000		
				installed on stage	PAYLOAD
			50	Section of the second section of the second	
UPPER AXIS	_	R AXIS	LOWER AXIS	REQUIREMENT	PARAMETER
				Constitute &	

ENCODER INFORMATION (IF APPLICABLE	APPLICABLE)	PERFORMED BY:
PARAMETER	LOWER AXIS	UPPER AXIS
MODEL NO.	RENISHAW RGH22	
SERIAL NUMBER		
OUTPUT (DIFF/SINGLE)		
RESOLUTION	0.1 UM	

	220028		Coults - Nottillal (lavel
	500650		Counts Naminal traval
	-257582		Trial 3
	-257582	+ / - 1 ENCODER COUNT	Trial 2
	-257582		Trial 1
			Counts – Limit to index
	509954		Trial 3
	509954	+ / - 1 ENCODER COUNT	Trial 2
	509954		Trial 1
UPPER AXIS	LOWER AXIS		Counts - Full Length
		ENCODER REPEATABILITY: performed at customer required velocity	ENCODER REPEATABILITY:

		10	8	6	5	Positional Accuracy (um)
		1200	800	600	400	
LOWER	UPPER		- BY STAGE SIZE	SPECIFICATION - BY STAGE SIZE		POSITIONAL ACCURACY

SERVO TUNING			PERFORMED BY:N/A	A
Axis	Proportional	Integral	Derivative	Bandwidth
Lower				
Upper				

ASSEMBLY CHECKLIST		PERFORMED BY:	
Feature	Completed	Feature	Completed
NA 1700 O SA 170		Stage has been cleaned	
Anodizing is acceptable		50	
		Preload sticker is attached	
Surface is free of scratches		a more parties on the state of	
		Logo / Serial Number are attached	
Shipping stop is installed			

REV	DESCRIPTION OF CHANGE	DATE
4	Updated specs to match newest catalog updates	12/17/01
51	Changed format of sheet back to original standard.	2/11/02

20000.0-40000.0-10000.0 A1000.0 15000.0 12.7 4.62 82000.0 1.88 Uni-Directional Repeatability (mm) Jixa Bi-Directional Repeatability (mm) Commanded Position (mm) 2.000 1.600 1.200 004.0 000.0 12.7 00100.0-08000.0-25.4 09000:0-04000.0-1.85 -0.00020 0.0000 Error (mm) 0.00020 0.00040 Periodic Error Commanded Position (mm) 0.08 0.04 30.0 0.02 10.0 0.0 **26000.0-**0.00030 -0.00025 Error -0.00020 S1000.0-01000.0-20000.0-0.00000 20000.0 Error (mm) 0.00010 S1000.0 Cummulative Error 00000.1 JYAA 007 7 Metric Single Scale Factor Technician 7 Motor Step/Rev 58287 Screw Pitch Screw Type sixA Travel (in) Serial Number Danaher Precision Systems Accuracy Test

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	(

Danaher Motion

7C Raymond Avenue Salem, New Hampshire 03079

TEL: 603.893.0588

FAX: 603.893.8711

Customer Service Repair Report

	Type	REPAIR	
UNIV. OF CALIF., SAN DIEGO DISBURSEMENTS DIVISION, 0955	Contact		
MAN DRIVE	Phone Fax		
LA JOLLA CA 92093-095	Email	0	
Returned Item	9	C	
Part Number 12-0923 Serial Number 58286		Date Received	3/5/2007
Part Description FM-400 2mm W/BRAKE Warranty YES		Date Complete	3/9/2007
Cust Ref Num		Date Shipped	3/9/2007
Customer Concern / Request			
Mechanical travel needs to be reduced to 2" of travel			
Diagnosis			
Stage not built to mechanical travel specs.			
Repairs Completed Repair By:			
Installed longer linear bearings to reduce mech. travel to spec.			

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600	0	1	4
Bo	ü	6	

7C Raymond Avenue Salem, New Hampshire 03079

TEL: 603.893.0588

FAX: 603.893.8711

Customer Service Repair Report

Type REPAIR Contact	
Phone	
Fax	
Email	
PO No. 0	
Date Received	3/5/2007
Date Complete	3/9/2007
Date Shipped	3/9/2007
	6 = e



Effective Date: 2/11/02

> Rev: 5 Doc# 1040364

Page 1 of 2

CUSTOMER UNIVERSITY OF CALIFORNIA COMMERCIAL or PRECISION PRECISION SALES ORDER NO.20611031 PART NO.12-0936 **SERIAL NO.58285** WORK ORDER NO.20611031.2 MODEL: FM-400 W BRAKE

PERFORMED BY:JIM M

WAY CHARACTERISTICS:					PERFORMED BY:JIM M	
	SPE	SPECIFICATION - BY STAGE SIZE	- BY STAGE S	SIZE	DIVIED AVIO	IDDER AXIS
PARAMETER	400	600	800	1200	- C	
	4	6	8	12	4	
FLATNESS (um)						
	4	6	8	12	4	
STRAIGHTNESS (um)						
	4	6	8	12	G 1	
PITCH (arc-seconds)						
	4	6	8	12	ယ	
YAW (arc-seconds)						
		Commercial: <= 50 arc-sec	<= 50 arc-sec		N/A	
ORTHOGANALITY (arc-sec)	_	Precision: <= 20 arc-seconds	20 arc-second	S		

CENTER	+	111111111111111111111111111111111111111	TEST AXIS		ORTHOGANALITY CALCL
			+		ORTHOGANALITY CALCULATIONS (IF APPLICABLE)
			CENTER	NULI	
				NULL AXIS	PERFORMED BY:N/A
			MAX. CHANGE		P

arc-sec

	_	
	Orthogana	0.000
	₹	
A COLORINA	= 200,000 × 1	
INIGA CITATION OF THE PROPERTY	Linear Error / travel	
***	·/ tra	
3	vel	
•	11	
	avel =	

SCREW CHARACTERISTICS:				PERFORME	PERFORMED BY:JIM M	
PARAMETER		SPECIFICATIO	SPECIFICATION - BY STAGE SIZE			
	400	600	800	1200	LOWER	UPPER
	100	000				
Bidirectional Repeatability (um)	3	ယ	ω	ω	SEE LASER	
THE STATE OF THE PARTY OF THE P				2	TECT	
Accuracy (um)*	8	12	16	24	IEST	
			2 september 2	or portion for on	coder on page 2	

If system has an encoder, leave this section blank and complete positional accuracy portion for encode on page

PARAMETER	SPI	SPECIFICATION - BY SCREW DIA.	EW DIA.	LOWER	OFFER
- 1 11 0 11111 - 11.			77:12		
		.5 inch	.75 inch		
	Plus End	4 – 8 oz-in	8 – 12 oz-in	12	
				5	
Screw Torque	Center	4 – 8 oz-in	8 – 12 oz-in	72	
				5	
	Minus End	4 – 8 oz-in	8 – 12 oz-ın	72	

TRAVEL LIMIT DATA + direction Mechanical travel Mechanical travel Travel to limit
+ direction
Travel to limit
- direction PARAMETER - direction SPECIFICATION - ALL STAGES Nominal Travel - .06" (minimum) Nominal Travel + .06" (minimum) Nominal Travel + .015" - .035" Nominal Travel - .015" - .035 PERFORMED BY:JIM M .615 .610 .523 .518 LOWER AXIS UPPER AXIS



Final Inspection Report FM Stages

Rev: 5 Doc# 1040364

Effective Date: 2/11/02 Page 2 of 2

VELOCITY TESTS (tests performed over full travel in both + and - directions with payload) PERFORMED BY:JIM M

PARAMETER	REQUIREMENT	LOWER AXIS	S	UPPER AXIS	RAXIS
PAYLOAD	installed on stage	30			
		4000			
INITIAL VELOCITY	inches per second		I		
Company of the compan		30000			
MAXIMUM VELOCITY	inches per second				
		100000			
MAXIMUM ACCELERATION	inches per sec^2				
		Yes	No	Yes	No
8 HOUR RUN	completed				
		Yes	N _o	Yes	No
COLD START	completed				

8	ENCODER INFORMATION (IF APPLICABLE)	APPLICABLE)	PERFORMED BY:JIM M
	PARAMETER	LOWER AXIS	UPPER AXIS
	MODEL NO.	RENISHAW RGH22	
	SERIAL NUMBER		
	OUTPUT (DIFF/SINGLE)		
	RESOLUTION	0.1 UM	

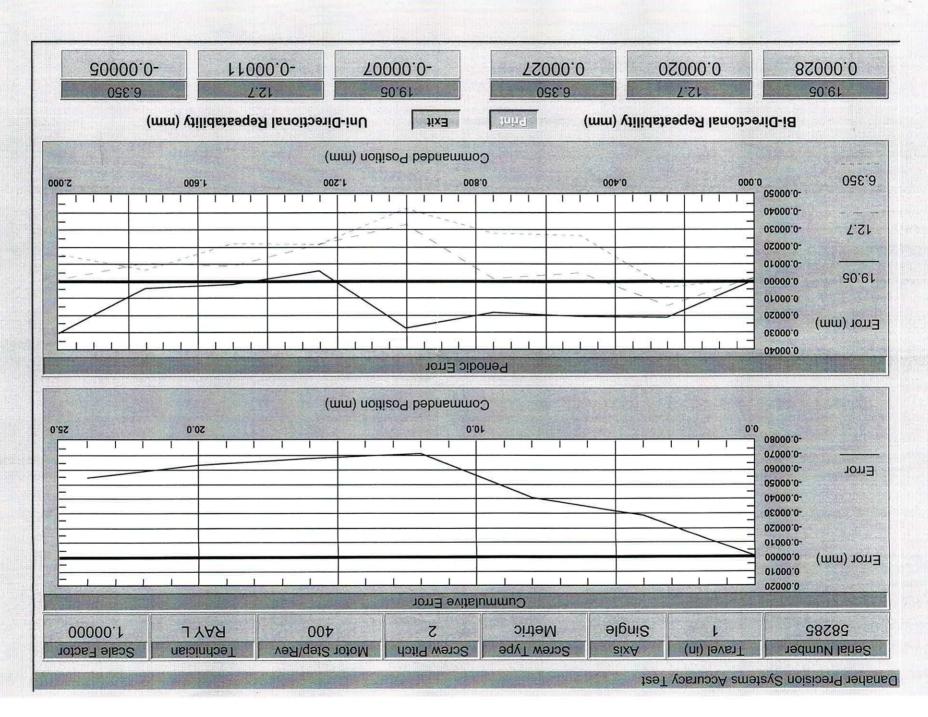
	263967		Counts - Nominal travel
	-125025		Trial 3
	-125025	+ / - 1 ENCODER COUNT	Trial 2
	-125025		Trial 1
			Counts – Limit to index
	254997		Trial 3
	254998	+ / - 1 ENCODER COUNT	Trial 2
	254996		Trial 1
UPPER AXIS	LOWER AXIS		Counts - Full Length
		ENCODER REPEATABILITY: performed at customer required velocity	ENCODER REPEATABILITY:

	TEST					12:00 00 00 00 00 00 00 00 00 00 00 00 00
	SEE LASER	10	8	6	5	Positional Accuracy (um)
		1200	800	600	400	
LOWER	UPPER		- BY STAGE SIZE	SPECIFICATION - BY STAGE SIZE		POSITIONAL ACCURACY

	SERVO TUNING			PERFORMED BY:N//	A
Axis Proportional Integral Derivative Bandy	Axis	Proportional	Integral	Derivative	Bandwidth
Lower	Lower				
Upper	Upper				

ASSEMBLY CHECKLIST		PERFORMED BY:	
Feature	Completed	Feature	Completed
		Stage has been cleaned	
Anodizing is acceptable			
		Preload sticker is attached	
Surface is free of scratches			
		Logo / Serial Number are attached	
Shipping stop is installed			

REV	DESCRIPTION OF CHANGE	DATE
4	Updated specs to match newest catalog updates	12/17/01
5	Changed format of sheet back to original standard.	2/11/02





FM Stages **Final Inspection Report** Date: 2/11/02

> Rev: 5 Doc# 1040364

Page

1 of 2

Effective

WORK ORDER NO. PART NO.12-0923 SERIAL NO .58286 20611031.1

20611031 COMMERCIAL or PRECISION PRECISION SALES ORDER NO. CUSTOMER University of california MODEL: FM-400 W/ BRAKE

WAY CHARACTERISTICS

PERFORMED BY: JIM M

						(/
		S	Precision: <= 20 arc-seconds	recision: <= 2	-	ORTHOGANALITY (arc-sec)
	N/A		Commercial: <= 50 arc-sec	Commercial:		
						YAW (arc-seconds)
		12	œ	6	4	
						PITCH (arc-seconds)
	5	12	8	6	4	
	202					STRAIGHTNESS (um)
	3	12	8	6	4	The state of the s
						FLATNESS (um)
	3	12	8	6	4	
OFFER AXIS	LOWER AXIS	1200	800	600	400	TARAMETER
		SIZE	SPECIFICATION - BY STAGE SIZE	CIFICATION -	SPE	

ORTHOGANALITY CALCULATIONS (IF APPLICABLE)

PERFORMED BY: N/A

		NULL AXIS	AXIS	
TEST AXIS	+	CENTER	ž.	MAX. CHANGE
+				
CENTER				
200				

Linear Error: (Max change +) plus (Max change -) Orthoganality = 200,000 x Linear Error / travel =

arc-sec

SCREW CHARACTERISTICS:				PERFORMED BY:	ED BY:	
PARAMETER		SPECIFICATIO	SPECIFICATION - BY STAGE SIZE			
	400	600	800	1200	LOWER	UPPER
Bidirectional Repeatability (um)	3	3	3	3	SEE LASER	
Accuracy (um)*	œ	12	16	24	TEST	
16		L Figure 2				

If system has an encoder, leave this section blank and complete positional accuracy portion for encoder on page 2

PARAMETER	SPE	SPECIFICATION - BY SCREW DIA.	EW DIA.	LOWER	UPPER
		.5 inch	.75 inch		
	Plus End	4 – 8 oz-in	8 – 12 oz-in	12	
Screw Torque	Center	4 – 8 oz-in	8 – 12 oz-in	12	
	Minus End	4 – 8 oz-in	8 – 12 oz-in	12	

TRAVEL LIMIT DATA

PERFORMED BY:JIM M

		Nominal Travel015"035"	- direction
	1.028		Travel to limit
		Nominal Travel + .015"035"	+ direction
	1.022		Travel to limit
	31 TV 10 TV	Nominal Travel06" (minimum)	- direction
	1.289		Mechanical travel
		Nominal Travel + .06" (minimum)	+ direction
	1.309		Mechanical travel
UPPER AXIS	LOWER AXIS	SPECIFICATION – ALL STAGES	PARAMETER



Doc# 1040364

Effective Date: 2/11/02

Rev: 5 Page 2 of 2

VELOCITY TESTS (tests performed over full travel in both + and - directions with payload) PERFORMED BY:

PARAMETER PAYLOAD	REQUIREMENT installed on stage	LOWER AXIS	AXIS	UPPER AXIS	₹ AXIS
PAYLOAD		50			
	illoration off stage	1000			
		1000			
		0000			
INITIAL VELOCITY	inches per second				
		30000			
MAXIMUM VELOCITY	inches per second				
		100000			
MAXIMUM ACCELERATION	inches per sec^2				
		Yes	No	Yes	N _o
8 HOUR RUN	completed				
		Yes	N _o	Yes	No
COLD START	completed				

ENCODER INFORMATION (IF APPLICABLE)	APPLICABLE)	PERFORMED BY:
PARAMETER	LOWER AXIS	UPPER AXIS
MODEL NO.		
SERIAL NUMBER		
OUTPUT (DIFF/SINGLE)		
RESOLUTION		

ENCODER REPEATABILITY:	ENCODER REPEATABILITY: performed at customer required velocity		
Counts - Full Length		LOWER AXIS	UPPER AXIS
Trial 1		50995	
Trial 2	+ / - 1 ENCODER COUNT	50995	
Trial 3		50995	
Counts - Limit to index			
Trial 1		-267162	
Trial 2	+ / - 1 ENCODER COUNT	-267162	
Trial 3		-267162	
Counts - Nominal travel		520973	
The second secon			

	2		
Axis	SERVO TUNING	Positional Accuracy (um)	
Proportional		5	400
Integral		6	600
ral		8	800
Derivative	PERFORMED BY:N/A	10	1200
Bar	:N/A	SEE LASER	
ndwidth		TEST	

SPECIFICATION - BY STAGE SIZE

LOWER

POSITIONAL ACCURACY

ASSEMBLY CHECKLIST		PERFORMED BY:	
Feature	Completed	Feature	Completed
		Stage has been cleaned	
Anodizing is acceptable		200	
		Preload sticker is attached	
Surface is free of scratches			
Shipping stop is installed		Logo / Serial Number are attached	

REV	DESCRIPTION OF CHANGE	DATE
4	Updated specs to match newest catalog updates	12/17/01
5	Changed format of sheet back to original standard.	2/11/02

