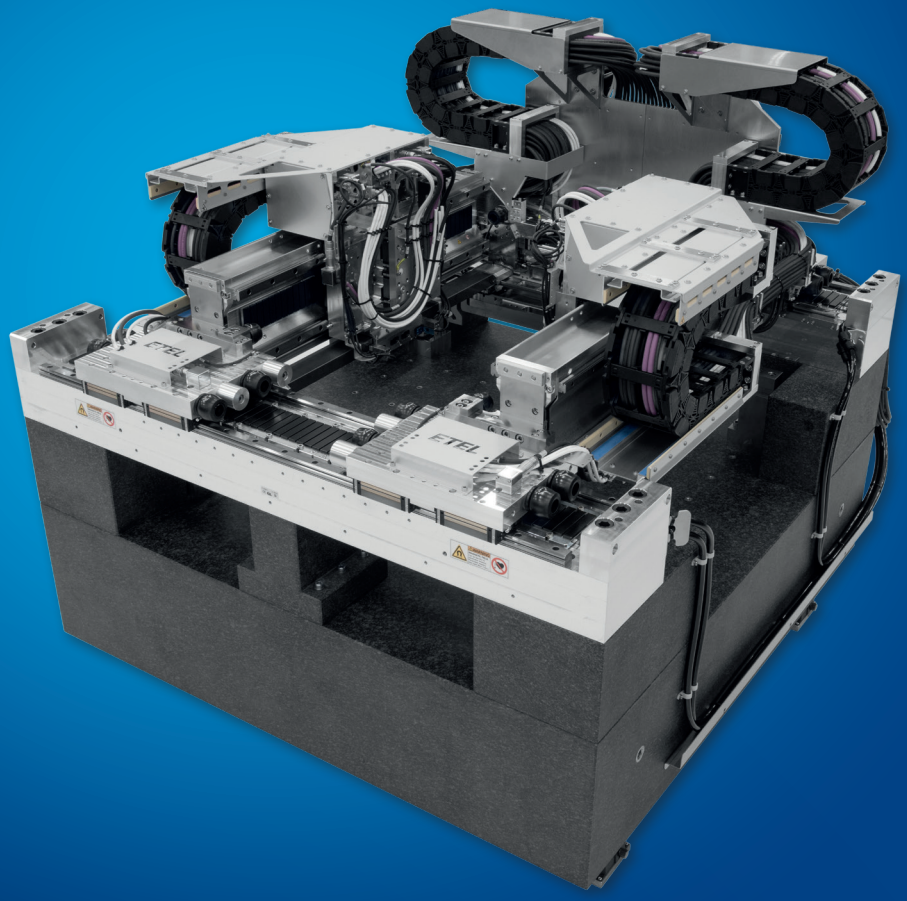


XYZ DUAL GANTRY SYSTEM

ASME-YGNN-08-0410-0445W3

TELICA

Data sheet

Version 1.1

ETEL

AXIS DESIGNATION				
Number of controlled axes		8		
Axes name		X1-L, X2-L, X1-R, X2-R	Y-L, Y-R	Z-L, Z-R
Thrust transmitter: DD (direct drive) or ID (indirect drive)		DD	DD	DD

TESTING CONDITIONS	UNIT			
Position controller	-	3xAccurET 400 15/40A, 1xAccurET 400 10/20A, 6xAccurET 48 2.5/5A		
Motion controller	-	UltimET Light		
Dual feedback		On		
Water cooling		On		
Rated payload	kg	-	-	2
Tool point position	mm	In X direction: 44 mm in front of the Z carriage In Y direction: 71 mm from the X2 side of the Z carriage In Z direction: 86 mm below the Y carriage bottom face		
Ambient temperature	°C	22°C ± 1.0°C		
Isolation system	-	None		

DIMENSIONAL DATA	UNIT			
Width	mm	1360		
Length	mm	1280		
Height	mm	1170		
Total stroke	mm	410	445	30
Moving mass (without payload)	kg	67.0 per gantry beam	19	1.7
Total mass (without payload)	kg	1'700		

FORCE CAPABILITIES	UNIT			
Peak force	N	2 x 2000	1420	304
Continuous force (1)	N	2 x 916 (2 x 331)	656 (285)	96 (46)
Standstill force (1)	N	2 x 706 (2 x 250)	506 (215)	73 (35)
Max. detent force (average to peak)	N	2 x 28	20	9
Static friction (maximal value)	N	2 x 43	49	25
Dynamic friction (maximal value)	N/(m/s)	2 x 136	98	15

LOAD CAPACITIES	UNIT	
Maximum payload	kg	Application dependent, please contact ETEL
Bonding force	N	30

DYNAMIC PERFORMANCE	UNIT			
Maximum speed	m/s	2	2	1
Maximum acceleration	m/s^2	40	60	75
Typical position stability at 1kHz, 3σ	nm	±150	±150	±125
Throughput	UPH	Up to 10'000 UPH with typical pick and place cycle (2)		

STAGE ACCURACY	UNIT			
Positioning reliability in XY plane @ 3σ (3)	µm	±1.5	±1.0	-
Bidirectional repeatability @ 3σ (4)	µm	±0.35		±0.15
XY repeatability after Z move @ 3σ (4)	µm	±0.25		-
Rx accuracy / Rx repeatability @ 3σ (4)	arcsec	±25 / ±3		
Ry accuracy / Ry repeatability @ 3σ (4)	arcsec	±30 / ±3		

WORKING ENVIRONMENT		
Clean room compatibility (5)	-	ISO 5
IP protection grade	-	IP 30

SYSTEM ENCODER CHARACTERISTICS	UNIT			
Encoder and signal type	-	Optical	Optical	Optical
Output signal	-	Absolute / EnDat 22	Absolute / EnDat 22	Absolute / EnDat 22
Signal period or line count	µm	40	40	40
Reference mark	-	None	None	None
Power supply	V	3.6 to 14	3.6 to 14	3.6 to 14

MMF ENCODER CHARACTERISTICS	UNIT			
Encoder and signal type	-	Optical	Optical	Optical
Output signal	-	1 Vpp	1 Vpp	1 Vpp
Signal period or line count	µm	4	4	4
Reference mark	-	None	None	None
Power supply	V	5±0.25	5±0.25	5±0.5

ELECTRICAL SPECIFICATIONS (6)		UNIT	X1-L, X2-L, X1-R, X2-R	Y-L, Y-R	Z-L, Z-R
	Motor type	-	Ironcore	Ironcore	Ironcore
	Motor model	-	LMG15-070-3TA-209	LMG15-050-3TA-209	LMG05-030-3QA-H01
	Number of phases	-	3	3	3
Kt	Force constant	N/Arms	109	77.6	29.7
Ku	Back EMF constant (7)	Vrms/(m/s)	65.8	47	18
Km	Motor constant	N/√W	41	33.2	13.3
R20	Electrical resistance at 20°C (7)	Ohm	4.67	3.63	3.35
L1	Electrical inductance (7) (1)	mH	30.0 (32.3)	21.4 (22.9)	14.8 (15)
Ip	Peak current	Arms	27.9	27.9	16.9
Ic	Continuous current (1)	Arms	9.05 (3.18)	9.03 (3.81)	3.34 (1.60)
Is	Standstill current (1)	Arms	6.85 (2.41)	6.84 (2.89)	2.53 (1.21)
ns	Standstill speed (1)	mm/s	1.8 (0.15)	2.2 (0.17)	1.1 (0.19)
Udc	Nominal input voltage	VDC	400	400	400
Pc	Max. cont. power dissipation (1)	W	777 (82)	596 (91)	68.8 (14.9)
2τp	Magnetic period	mm	32	32	32

WATER COOLING CHARACTERISTICS		UNIT		
Δθw	Water temperature difference for Pc	K	8	7
qw	Minimum water flow for Δθw	l/min	1.5	1.6
Δpw	Max. pressure drop at qw	bar	2.5	2.5
θw	Inlet water temperature	°C	22	22

TYPICAL MOVE AND SETTLE TIMES (8)	UNIT			
Move 1: 0.1 mm within ± 1.5 µm	ms	31.9	35.5	-
Move 2: 50 mm within ± 1.5 µm	ms	152	119	-
Move 2: 200 mm within ± 1.5 µm	ms	245	195	-

GUIDING ELEMENTS				
Type	-	Ball bearings	Ball bearings	Ball bearings

MATERIAL AND FINISH				
Frame	-	Granite or polymer concrete		
Carriage	-	-	-	Aluminium

OPTIONS / ACCESSORIES / FEATURES	UNIT	
Cables and tubes		Integrated cables and tubes for customer process (for details contact ETEL)
Watercooling hydraulic kit		As an option
Chiller		As an option

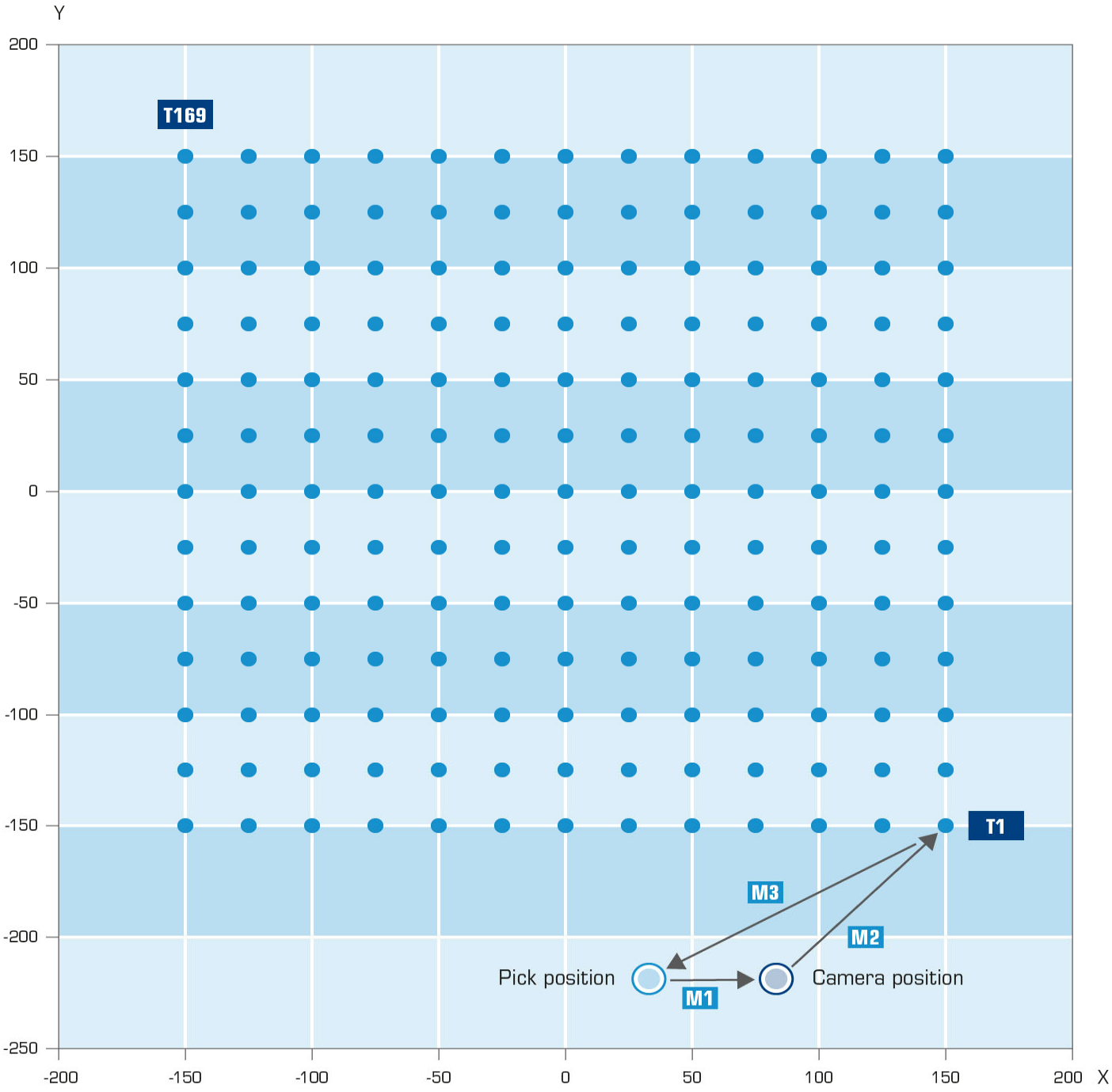
According to the Machinery Directive 2006/42/EC, the system presently described falls into the "partly completed machinery" category and fully complies with it as long as the system is operated according to the working conditions described in the corresponding manual. Customer is responsible for setting safeties/limitations that will keep the motor in its safe operating area. ETEL cannot be held responsible if the system is used in an improper way.

Notes: The specifications given may be mutually exclusive. Unless stated otherwise, all measurements are made within the testing conditions.
(1) Values into brackets correspond to the safety values to use in case of error in the water cooling system
(2) See description on last page
(3) XYZ typical cycle @ 7'200 UPH with mapping and 4 points calibration every 5 min
(4) X, Y: 10 mm move, 25 m/s^2, Z: 1 mm move, 75 m/s^2
(5) At tool point height, with 0.4±0.1 m/s air flow in Y+ direction, typical cycle 4'000 UPH
(6) Tolerances on electrical parameters are available on request
(7) Terminal to terminal
(8) Specification given when only one gantry is moving

TYPICAL PICK AND PLACE CYCLE

Workspace for targets: 300 x 300 mm
Target pitch 25 mm (13 x 13 targets)

Cycle steps	Description
1	Move (M1) from "Pick position" to "Camera position"
2	Move (M2) from "Camera position" to T1 (target 1)
3	Move (M3) from T1 (target 1) to "Pick position"
4	Repeat over the 169 targets
5	Wait for 8s
6	Repeat steps 1 to 5



Acceleration [m/s^2]	Speed [m/s]	Jerk time [ms]	Wait time at pick position [ms]	Wait time at camera position [ms]	Wait time at targets [ms]	Pause at end of grid [s]	Throughput dual gantry [UPH]	Time for one complete cycle [s]
X & Y = 25	X & Y = 2	25	100	150	150	8	7200	169
X = 35 Y = 60	X & Y = 2	25	50	50	100	8	10'200	119