

# TECHNICAL DRAWING



<b>Document Number</b>	H006908	<b>Control Number</b>	LSP-X1h #14
<b>Document Name</b>	Parameters, Analog Probe	<b>Document Revision</b>	1
<b>Author</b>	K. Michael	<b>Date</b>	Feb. 22, 2013
<b>Approver</b>	P. Racine		

COMMON FIRMWARE GLOBAL ANALOG PROBE CONTROLLER CONSTANTS									
Probe: Spring Rate Constant: PRBTYP:	SP600 1.2 SP6	SP80 2 SP8	SP25 0.5 SP5	LSP-X3c / t 5 MT3	LSP-X5 5 MT5	LSP-X1s/c/h 1.2 X1s/X1m/X1h/X1c	LSP-X1m 0.6 X1m		
# Constant	Value	Value	Value	Value	Value	Value	Value	Unit	Definition
14 SLOW_JOG	*	*	*	* / 10 for 3t	*	10	10	mm/sec	Slow jog velocity
20 MAX_ACCL †	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	Maximum acceleration (XYZ)
28 APRB_TRG	0.3	0.3	0.3	0.1	0.2	0.06	0.06	mm	Maximum force
29 APRB_OVT	1.4	2	2	1.4	1.5	1.4	1.4	mm	Analog probe overtravel
30 SCNP_OFF	0.1	0.1	0.2**	0.04 / 0.07	0.04 / 0.07	0.03 / 0.07	0.03 / 0.07	mm	Scan distance into the part ( OL / CL )
32 SCN_ACC	10	10	10	10	10	10	10	mm/sec <sup>2</sup>	Scan Acceleration
37 HAVE_PH9	0, 1, 2, 3, 4	0	0, 1, 2, 3, 4	0 / 3, 4 for 3t	0	4 / 0 for 1c	4	integer	1, 2, 3: Ren. & TesaStar 7.5* , 4: TesaStar wrist
39 CMMCONFG***	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Bit Pattern	bit 8 ( 256) Enable probe @ home
	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Bit Pattern	bit 9 ( 512) Disable DAMP in Fast jog
	ON	ON	ON	ON	ON	ON	ON	Bit Pattern	bit 14 (16384) PRBRDV enabled
40 SP6_RES	0.00006	7.8125E-06	0.00006	0.00006	0.00006	0.00006	0.00006	mm	Analog probe resolution
41 AP_ULMT	0.15	0.08	0.15	0.05	0.05	0.04	0.04	mm	Probing window Upper limit
42 AP_LLMT	0.05	0.02	0.05	0.008	0.008	0.008	0.008	mm	Probing window Lower limit
43 AP_DIV	6	10	6	5	5	5	5	integer	Return speed divisor
86 ACR_PAR arg. 7	4	0	4	* / 4 for 3t	0	4 for X1sh / 0 for c	4	integer	Force wrist reset after tool change (Quindos)
87 AP_RLMT	0.5	0.5	0.5	0.5	0.5	0.5	0.5	mm	Retract distance for FINEPRB probing
97 MAX_DECL †	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	Maximum deceleration (XYZ)
98 TTP_DECL	*	800	*	150	150	150	150	mm/sec <sup>2</sup>	Touch trigger probe deceleration (XYZ)
104 ONLOFS	*	1,1,1	*	*	*	*	*	Boolean	1=No integrator during movement (XYZ)
141 OBS_FILT	10	10	10	5	5	5	5	hz	Filter applied when Observer is active
142 PRBCONFG***	0	0	1	0	0	0	0	Bit Pattern	1=Use Renishaw calibration algorithm
146 PHSCONFG***	0	0	0	0 / 4 for 3t	0	4	4	Bit Pattern	bit 2 ( 4) Force WD / WE for TesaStar-m
150 CMMCONF2***	ON	ON	ON	ON	ON	ON	ON	Bit Pattern	bit 5 ( 32) Enable scan radial deviation
112 FLYPARSW***	OFF	OFF	OFF	OFF	OFF	OFF	OFF	Bit Pattern	bit 9 ( 512) Prevents scan errors ( FW < v33 )

\* Default values are used for each cmm type  
 \*\* Set to 0.1 (0.2 mm) Newton for calibration @ 10 mm/second and 10 pts/mm  
 \*\*\* CMMCONFG, PRBCONFG, PHSCONFG, CMMCONF2 and FLYPARSW are bit patterns. Therefore, the values above must be added (ON) or subtracted (OFF) from the original value displayed from the SHOW command.  
 † Global D Performance acceleration and deceleration are 600 mm/sec<sup>2</sup>  
 Example: >set CMMCONFG < CMMCONFG 21139  
           >set\_par CMMCONFG, 20627 <% (subtract 512 to turn off bit 9)  
           >set\_par file\_wrt <%

Alternative control element PID values.  
 ( If closed loop scans lose part contact )  
 34 SCNCTLP 0.5  
 35 SCNCTLI 0.4  
 36 SCNCTLD 0.2

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<b>Approver</b>	P. Racine		

COMMON FIRMWARE GLOBAL ANALOG PROBE PC-DMIS REGISTRY SETTINGS									
Probe: Spring Rate Constant: PRBTYP:	SP600 1.2 SP6	SP80 2 SP8	SP25 0.5 SP5	LSP-X3c / t 5 MT3	LSP-X5-2/-3 5 MT5	LSP-X1s/l/h 1.2 X1s/X1m/X1h/X1c	LSP-X1m 0.6 X1m	Unit	Definition
<b>[USER_ANALOG_PROBING]</b>									
MoveAccuracy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	mm	Position vector accuracy
ProbeAccuracy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	mm	Probing vector accuracy
ProbeLowerForce	0.06	0.04	0.025	0.04	0.04	0.0096	0.0048	Newton	Probing window Lower limit
ProbeMaxForce	0.36	0.6	0.15	0.5	1.00	0.072	0.036	Newton	Maximum force
ProbeMode	DFL	DFL	DFL	DFL	DFL	DFL	DFL	string	Probing type
ProbenumberOfData	10	10	10	10	10	10	10	integer	# of points in probing window
ProbeReturnSpeed	1.0	0.6	1.0	0.4	0.4	0.4	0.4	mm/sec	Probe speed / Return Speed Divider
ProbeTriggerForce	0.12	0.1	0.05	0.15	0.15	0.03	0.02	Newton	Force of reported probing
ProbeUpperForce	0.18	0.16	0.075	0.25	0.25	0.048	0.024	Newton	Probing window Upper limit
ScanAcceleration	10	10	10	10	10	10	10	mm/sec <sup>2</sup>	Acceleration during scans
ScanOffsetForce	0.12	0.20	0.1 **	0.2	0.2	0.036	0.018	Newton	Offset into the part during scanning
SP6MTXLowerForce_<PRBTYP>	0.18	0.3	N/A	0.04	0.04	0.0096	0.0048	Newton	Probing window Lower limit for LLM
SP6MTXMaxForce_<PRBTYP>	0.54	0.9	N/A	1	1.5	0.24	0.12	Newton	Maximum force for LLM
SP6MTXUpperForce_<PRBTYP>	0.36	0.5	N/A	0.54	0.54	0.12	0.06	Newton	Probing window Upper limit for LLM
<b>[LEITZ]</b>									
ConstantSpatialDensity	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use constant spacial density
DefinedScanOffset	0.12	0.2	0.05 **	0.2	0.2	0.036	0.018	Newton	Offset into the part during scanning
DisableFastProbe	FALSE	FALSE	N/A	FALSE	FALSE	FALSE	FALSE	Boolean	Enable FastPRB function
DisableTraxCal	FALSE	FALSE	N/A	FALSE	FALSE	FALSE	FALSE	Boolean	Enable Trax calibration
EnableEstatus	*	*	*	FALSE	*	FALSE	FALSE	Boolean	PC-Dmis command
EnableShowEstop	*	*	*	TRUE	*	TRUE	TRUE	Boolean	PC-Dmis command
ForceDVMOUT	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Force probe XYZ output
NewtonToMMConversion_LSP-X1C	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_LSP-X1H	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_LSP-X1M	0.6	0.6	0.6	0.6	0.6	0.6	0.6	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_LSP-X1S	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_SP25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_SP600	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf)/mm	Spring rate constant conversion
NewtonToMMConversion_SP80	2.0	2.0	2.0	2.0	2.0	2.0	2.0	(grf)/mm	Spring rate constant conversion
SendHSSVectors	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Send vectors used by Observer
SendOptionProbeOnManualHit	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Force correct parameters for manual hits
SupportsDVMOUT	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Supports probe XYZ output
SupportsFastProbe	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Enable FastPRB
SupportsPRBRDV	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use PRBRDV
UseTraxWithSP600	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Supports PRBRDV
VariableHighSpeedScanning	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use VHSS open loop algorithm
<b>[Option]</b>									
UseTraxWithSP800	1	1	N/A	1	1	1	1	Boolean	Use Quindos calibration method
MaxAccelX	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration X-axis
MaxAccelY	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration Y-axis
MaxAccelZ	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration Z-axis
<b>[USER_ProbeCal]</b>									
RenishawCalibrationOrderSP25	N/A	N/A	3	N/A	N/A	N/A	N/A	Value	Renishaw calibration algorithm order
RenishawCircleScanUsesHssdat	N/A	N/A	1	N/A	N/A	N/A	N/A	Boolean	Use HSSDAT for calibration scans
RenishawScanOffsetMultiplier	N/A	N/A	2.5	N/A	N/A	N/A	N/A	Value	Multiplier for Renishaw calibration
ScanrdvCircleScanUsesHssdat	1	1	N/A	1	1	1	1	Value	Use HSSDAT for calibration SCNRDV

\* Use standard values for each cmm type. \*\* Set to 0.1 (0.2 mm) Newton for calibration @ 10 mm/second and 10 pts/mm \*\*\* Global D Performance accel. and decel. are 600 mm/sec<sup>2</sup>

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<b>Author</b>	K. Michael	<b>Date</b>	Feb. 22, 2013
<b>Approver</b>	P. Racine		

DISTRIBUTED CONTROLLOR GLOBAL SILVER ANALOG PROBE PC-DMIS REGISTRY SETTINGS									
Probe: Spring Rate Constant: PRBTYP:	SP600 1.2 SP6	SP25 0.5 SP8	LSP-X3c / t 5 MT3	LSP-X5-2/-3 5 MT5	LSP-X1h 1.2 X1h	LSP-X1s / c 1.2 X1s/X1m/X1c	LSP-X1m 0.6 X1m	Unit	Definition
<b>[USER_ANALOG_PROBING]</b>									
MoveAccuracy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	mm	Position vector accuracy
ProbeAccuracy	0.10	0.10	0.10	0.10	0.10	0.10	0.10	mm	Probing vector accuracy
ProbeLowerForce	0.08	0.025	0.04	0.04	0.019	0.019	0.010	Newton	Probing window Lower limit
ProbeMaxForce	0.36	0.15	0.5	1	0.098	0.098	0.048	Newton	Maximum force
ProbeMode	DFL	DFL	DFL	DFL	DFL	DFL	DFL	string	Probing type
ProbenumberOfData	10	10	10	10	10	10	10	integer	# of points in probing window
ProbeReturnSpeed	1.0	1.0	0.4	0.4	0.4	0.4	0.4	mm/sec	Probe speed / Return Speed Divider
ProbeTriggerForce	0.12	0.05	0.15	0.15	0.033	0.033	0.020	Newton	Force of reported probing
ProbeUpperForce	0.18	0.075	0.25	0.25	0.072	0.072	0.036	Newton	Probing window Upper limit
ScanAcceleration	10	10	10	10	10	10	10	mm/sec <sup>2</sup>	Acceleration during scans
ScanOffsetForce	0.12	0.1	0.2	0.2	0.08	0.08	0.03	Newton	Offset into the part during scanning
SP6MTXLowerForce_<PRBTYP>	0.18	N/A	0.04	0.04	0.04	0.0096	0.0048	Newton	Probing window Lower limit for LLM
SP6MTXMaxForce_<PRBTYP>	0.54	N/A	1	1.5	1.5	0.24	0.12	Newton	Maximum force for LLM
SP6MTXUpperForce_<PRBTYP>	0.36	N/A	0.54	0.54	0.54	0.12	0.06	Newton	Probing window Upper limit for LLM
<b>[FDC]</b>									
ConstantSpatialDensity	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use constant spacial density
DefinedScanOffset	0.12	0.05 **	0.2	0.2	0.05	0.036	0.018	Newton	Offset into the part during scanning
DisableFastProbe	FALSE	N/A	FALSE	FALSE	FALSE	FALSE	FALSE	Boolean	Enable FastPRB function
DisableTraxCal	FALSE	N/A	FALSE	FALSE	FALSE	FALSE	FALSE	Boolean	Enable Trax calibration
EnableEstatus	*	*	FALSE	*	*	FALSE	FALSE	Boolean	PC-Dmis command
EnableShowEstop	*	*	TRUE	*	*	TRUE	TRUE	Boolean	PC-Dmis command
ForceDVMOUT	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Force probe XYZ output
NewtonToMMConversion_LSP-X1C	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_LSP-X1H	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_LSP-X1M	0.6	0.6	0.6	0.6	0.6	0.6	0.6	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_LSP-X1S	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_SP25	0.5	0.5	0.5	0.5	0.5	0.5	0.5	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_SP600	1.2	1.2	1.2	1.2	1.2	1.2	1.2	(grf/mm)	Spring rate constant conversion
NewtonToMMConversion_SP80	2.0	2.0	2.0	2.0	2.0	2.0	2.0	(grf/mm)	Spring rate constant conversion
SendHSSVectors	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Send vectors used by Observer
SendOptionProbeOnManualHit	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Force correct parameters for manual hits
SupportsDVMOUT	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Supports probe XYZ output
SupportsFastProbe	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Enable FastPRB
SupportsPRBRDV	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use PRBRDV
UseTraxWithSP600	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Supports PRBRDV
VariableHighSpeedScanning	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	Boolean	Use VHSS open loop algorithm
<b>[Option]</b>									
UseTraxWithSP600	1	N/A	1	1	1	1	1	Boolean	Use Quindos calibration method
MaxAccelX	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration X-axis
MaxAccelY	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration Y-axis
MaxAccelZ	*	800	*	800 / * for 3t	800	* for 1s / 800	*	mm/sec <sup>2</sup>	CMM acceleration Z-axis
<b>[USER_ProbeCal]</b>									
RenishawCalibrationOrderSP25	N/A	3	N/A	N/A	N/A	N/A	N/A	Value	Renishaw calibration algorithm order
RenishawCircleScanUsesHssdat	N/A	1	N/A	N/A	N/A	N/A	N/A	Boolean	Use HSSDAT for calibration scans
RenishawScanOffsetMultiplier	N/A	2.5	N/A	N/A	N/A	N/A	N/A	Value	Multiplier for Renishaw calibration
ScanrdvCircleScanUsesHssdat	1	N/A	1	1	1	1	1	Value	Use HSSDAT for calibration SCNRDV

\* Use standard values for each omm type. \*\* Set to 0.1 (0.2 mm) Newton for calibration @ 10 mm/second and 10 pts/mm \*\*\* Global D Performance accel. and decel. are 800 mm/sec<sup>2</sup>