Homologation

Cordless Assembly Tools

Model: CTBPW05Q

Serial no.: GC0060

Contents

Homologation: CTBPW05Q SN: GC0060

		Page
Cover sheet		1
Contents		2
Test sheet no. 2 (torque determination 30 %)		3
Machine Capability Study, Tool System	30 % hard	4
Machine Capability Study, Control System	30 % hard	7
Curves of the 1st and 100th measurement	30 % hard	10
Machine Capability Study, Tool System	30 % soft	11
Machine Capability Study, Control System	30 % soft	14
Curves of the 1st and 100th measurement	30 % soft	17
Test sheet no. 3 (torque determination 80 %)		18
Machine Capability Study, Tool System	80 % hard	19
Machine Capability Study, Control System	80 % hard	22
Curves of the 1st and 100th measurement	80 % hard	25
Machine Capability Study, Tool System	80 % soft	26
Machine Capability Study, Control System	80 % soft	29
Curves of the 1st and 100th measurement	80 % soft	32
Test sheet no. 4 (torque determination 100 %)		33
Machine Capability Study, Tool System	100 % hard	34
Machine Capability Study, Control System	100 % hard	37
Curves of the 1st and 100th measurement	100 % hard	40
Machine Capability Study, Tool System	100 % soft	41
Machine Capability Study, Control System	100 % soft	44
Curves of the 1st and 100th measurement	100 % soft	47
Annex 3 (ability contemplation at 40° / 60 %)	**without angle correction**	48
Graphical representation	40° / 60 %	50
Machine Capability Study, Tool System	40° / 60 %	51
Machine Capability Study, Control System	40° / 60 %	54
Curves of the 1st and 100th measurement	40° / 60 %	57
Annex 3 (ability contemplation at 40° / 60 %)	**with angle correction**	58
Graphical representation	40° / 60 %	60
Machine Capability Study, Tool System	40° / 60 %	61
Machine Capability Study, Control System	40° / 60 %	64
Curves of the 1st and 100th measurement	40° / 60 %	67
Annex 3 (ability contemplation at 180° / 80 %)	**without angle correction**	68
Graphical representation	180° / 80 %	70
Machine Capability Study, Tool System	180° / 80 %	71
Machine Capability Study, Control System	180° / 80 %	74
Curves of the 1st and 100th measurement	180° / 80 %	77
Annex 3 (ability contemplation at 180° / 80 %)	**with angle correction**	78
Graphical representation	180° / 80 %	80
Machine Capability Study, Tool System	180° / 80 %	81
Machine Capability Study, Control System	180° / 80 %	84
Curves of the 1st and 100th measurement	180° / 80 %	87

Test sheet no. 2

Machine Capability Study 30 %

Multi-stage tightening system	☑	Speed 50 rpm	1.4 %
Single-stage tightening system	☐	Speed 100 %	3525 rpm

Manufacturer: Apex Tool Group Serial no: **GC0060**

Test torque: Tq min. + 0.3 (Tq max. - Tq min.) 2.24 Nm

Hard joint (H)	13.42	Nm / Revolution	Angle degree	30°
Soft joint (L)	1.11	Nm / Revolution	Angle degree	360°

		H	**L**
a)	Tolerance down / up	2.08 - 2.40 Nm	2.08 - 2.40 Nm
	Tolerance down / up	7 %	7 %
	Average torque	2.24 Nm	2.22 Nm
	Standard deviation	0.01 Nm	0.01 Nm
	Torque scatter (99,73%)	0.09 Nm	0.06 Nm
	C_m	3.74	5.51
	C_{mk}	3.65	4.70

b)	Min. C_m hard/soft (lowest value)	3.74
	Min. C_{mk} hard/soft (lowest value)	3.65

Capability is reached if minimum C_{mk} value ≥1.67

Note:

Machine Capability Study
Control System

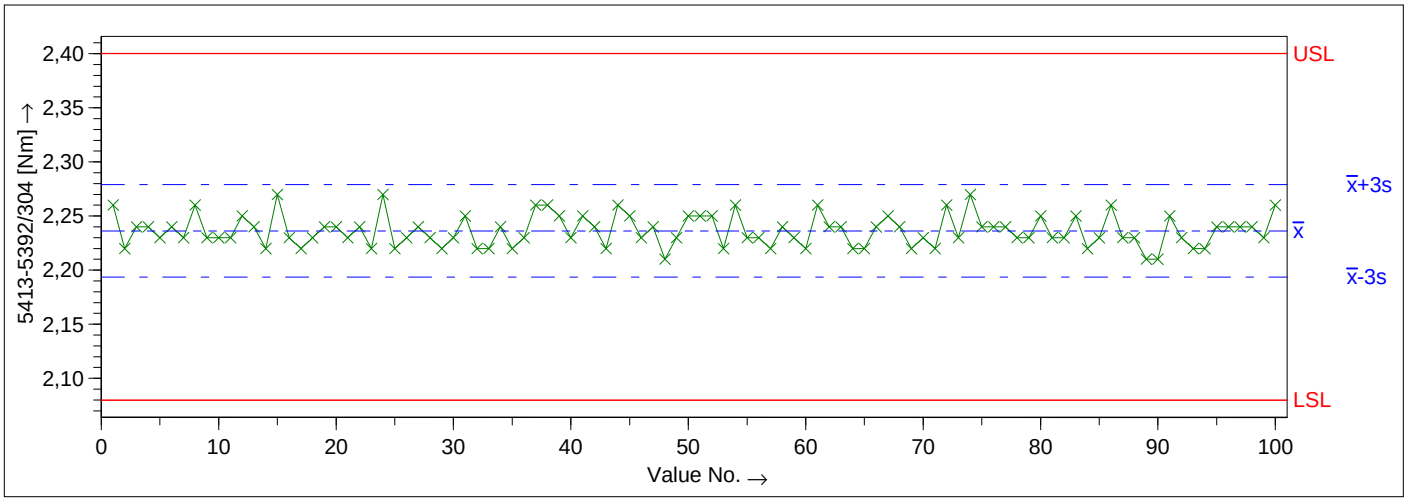
Cleco Production Tools

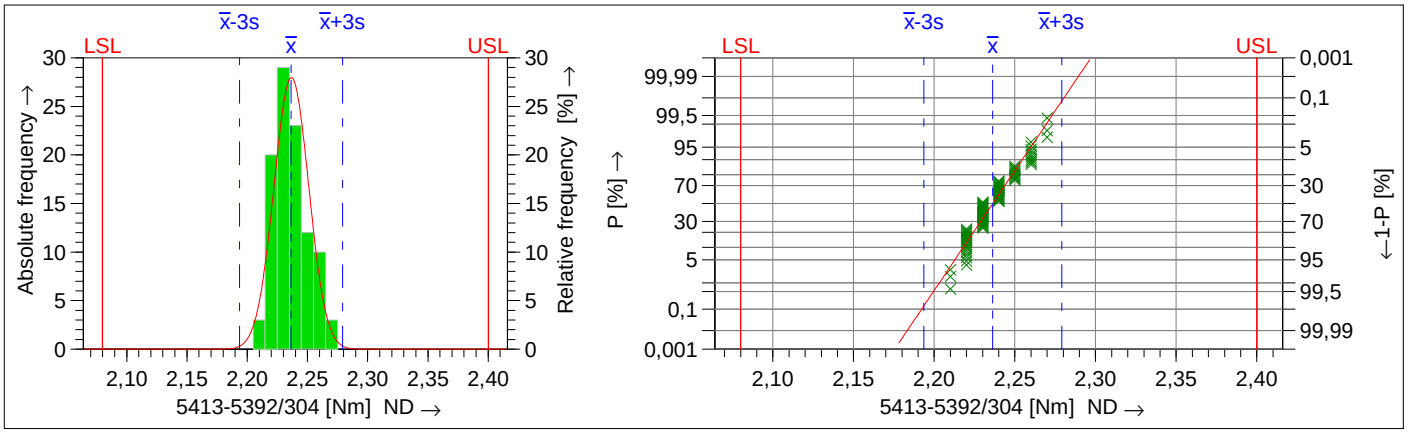
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	29.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0060d	Char.Descr.	5413-5392/304	Inspection Val. 2,24 0,16	USL 2,40
		Serial No.	5376169	Unit Nm -0,16	LSL 2,08
Char.Type	variable			Tolerance value 7 %	Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100

Evaluation from 29.03.2021 04:35:02 to 29.03.2021 04:56:28

Rem. TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2363
LSL	2.08	x_{min}	2.21	$\bar{x}$-3s	2.1935
USL	2.40	x_{max}	2.27	$\bar{x}$+3s	2.2791
T	0.32	R	0.06	6s	0.0856
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution		Normal Distribution	
Calculation method		$M1_{1.4}$ $\hat{\sigma} = s_{tot}$	
Potential Capability index	=	C_m	3.74
Critical capability index	=	C_{mk}	3.65

The requirements were met (C_m,C_{mk})

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Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 29.03.2021

Ser.No.	GC0060d	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	2,26	2,22	2,24	2,24	2,23	2,24	2,23	2,26	2,23	2,23
5376169	5413-5392/304	29,50	29,25	30,25	29,50	31,00	29,25	29,00	30,00	28,50	29,25

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	2,23	2,25	2,24	2,22	2,27	2,23	2,22	2,23	2,24	2,24
5376169	5413-5392/304	30,00	30,75	29,00	29,75	30,50	30,75	30,25	28,50	29,00	29,75

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	2,23	2,24	2,22	2,27	2,22	2,23	2,24	2,23	2,22	2,23
5376169	5413-5392/304	31,25	30,50	30,50	30,25	29,75	31,50	30,00	30,00	31,25	29,75

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	2,25	2,22	2,22	2,24	2,22	2,23	2,26	2,26	2,25	2,23
5376169	5413-5392/304	30,25	31,00	29,25	31,00	30,25	30,75	30,00	30,25	31,50	31,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	2,25	2,24	2,22	2,26	2,25	2,23	2,24	2,21	2,23	2,25
5376169	5413-5392/304	31,25	30,25	30,50	31,75	30,00	29,00	29,50	28,75	31,50	30,50

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	2,25	2,25	2,22	2,26	2,23	2,23	2,22	2,24	2,23	2,22
5376169	5413-5392/304	30,00	31,00	29,75	29,50	30,00	30,50	30,25	31,00	29,75	30,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	2,26	2,24	2,24	2,22	2,22	2,24	2,25	2,24	2,22	2,23
5376169	5413-5392/304	30,50	29,50	30,00	29,50	30,00	29,75	30,00	30,75	30,00	30,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	2,22	2,26	2,23	2,27	2,24	2,24	2,24	2,23	2,23	2,25
5376169	5413-5392/304	29,75	31,00	30,50	30,50	29,75	30,50	30,00	30,75	29,00	30,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 29.03.2021

Ser.No.	GC0060d	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	2,23	2,23	2,25	2,22	2,23	2,26	2,23	2,23	2,21	2,21
5376169	5413-5392/304	29,25	29,50	29,25	29,50	30,50	31,25	29,25	30,75	30,50	31,25

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	2,25	2,23	2,22	2,22	2,24	2,24	2,24	2,24	2,23	2,26
5376169	5413-5392/304	32,00	31,00	29,50	30,00	30,00	30,25	30,25	30,00	29,25	30,00

Machine Capability Study
Tool System

Page 1 / 1

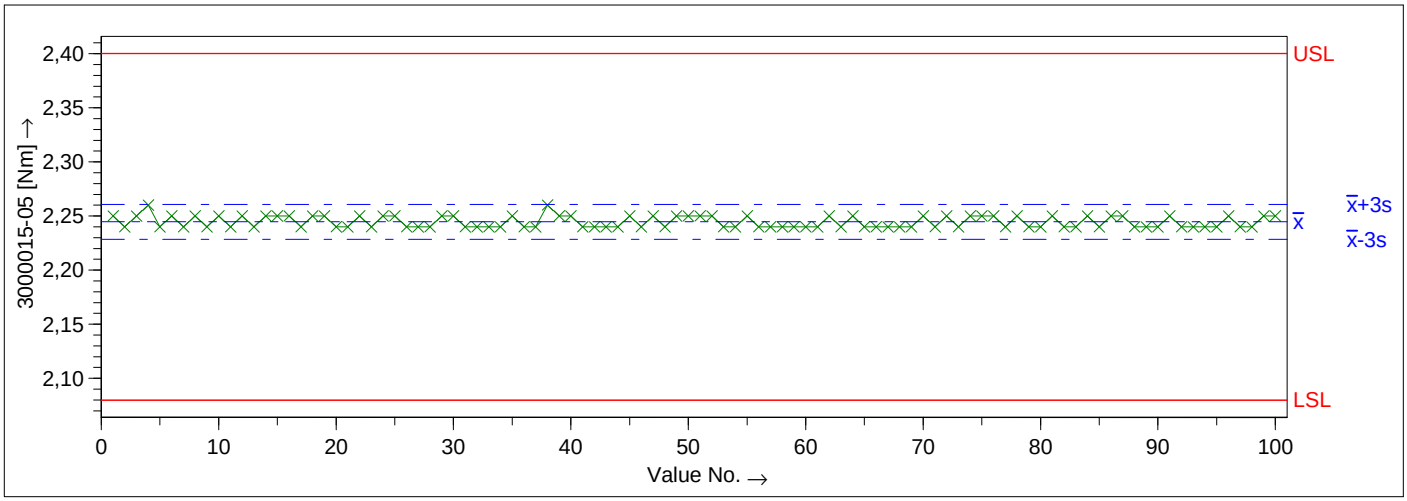
Plant ATG Lexington		Operator Name M. SHERMAN	Date 29.03.2021

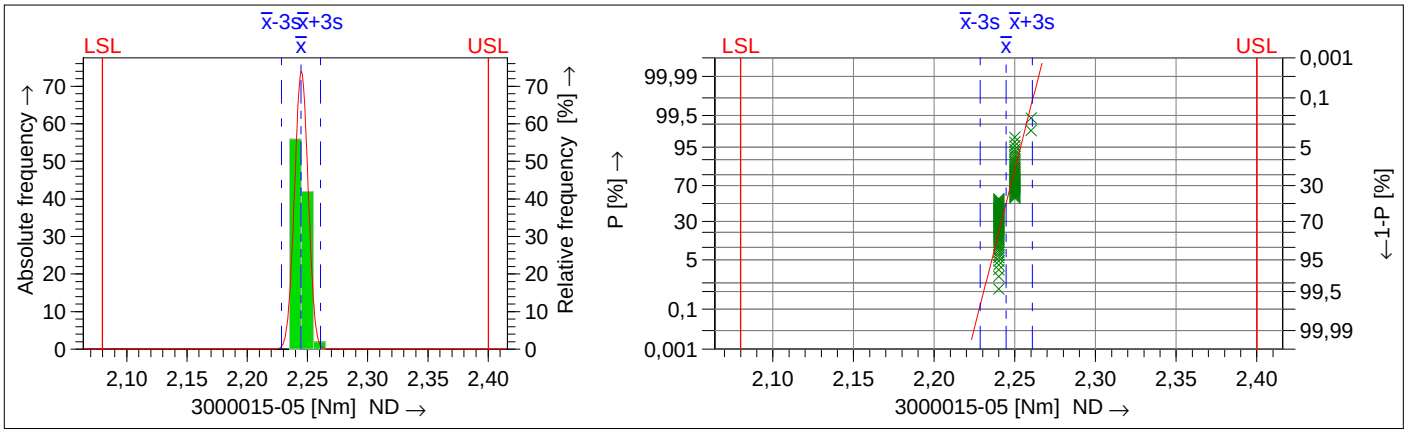
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060d	Char.Descr. 3000015-05	Inspection Val.	2,24	0,16	USL 2,40
	Serial No. 177718	Unit	Nm	-0,16	LSL 2,08
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2

Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100

Evaluation from 29.03.2021 16:35:00 to 29.03.2021 16:56:27

Rem. TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2446
LSL	2.08	x_{min}	2.24	$\bar{x}$-3s	2.2284
USL	2.40	x_{max}	2.26	$\bar{x}$+3s	2.2608
T	0.32	R	0.02	6s	0.0324
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	9.88
Critical capability index	=	C_{mk}	9.60

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 29.03.2021

Ser.No.	GC0060d	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	2,25	2,24	2,25	2,26	2,24	2,25	2,24	2,25	2,24	2,25
177718	3000015-05	30,00	29,00	30,00	30,00	31,00	29,00	29,00	30,00	29,00	29,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	2,24	2,25	2,24	2,25	2,25	2,25	2,24	2,25	2,25	2,24
177718	3000015-05	30,00	31,00	30,00	30,00	31,00	31,00	31,00	28,00	29,00	30,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	2,24	2,25	2,24	2,25	2,25	2,24	2,24	2,24	2,25	2,25
177718	3000015-05	31,00	31,00	31,00	30,00	30,00	32,00	30,00	30,00	31,00	30,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	2,24	2,24	2,24	2,24	2,25	2,24	2,24	2,26	2,25	2,25
177718	3000015-05	30,00	31,00	29,00	31,00	30,00	31,00	30,00	31,00	32,00	31,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	2,24	2,24	2,24	2,24	2,25	2,24	2,25	2,24	2,25	2,25
177718	3000015-05	31,00	30,00	31,00	32,00	31,00	29,00	29,00	29,00	32,00	30,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	2,25	2,25	2,24	2,24	2,25	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	30,00	32,00	30,00	30,00	30,00	30,00	30,00	31,00	30,00	31,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	2,24	2,25	2,24	2,25	2,24	2,24	2,24	2,24	2,24	2,25
177718	3000015-05	31,00	30,00	30,00	30,00	30,00	30,00	30,00	31,00	30,00	30,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	2,24	2,25	2,24	2,25	2,25	2,25	2,24	2,25	2,24	2,24
177718	3000015-05	30,00	32,00	30,00	31,00	30,00	31,00	30,00	31,00	30,00	31,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 29.03.2021

Ser.No.	GC0060d	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	2,25	2,24	2,24	2,25	2,24	2,25	2,25	2,24	2,24	2,24
177718	3000015-05	29,00	30,00	30,00	29,00	31,00	31,00	29,00	31,00	30,00	31,00

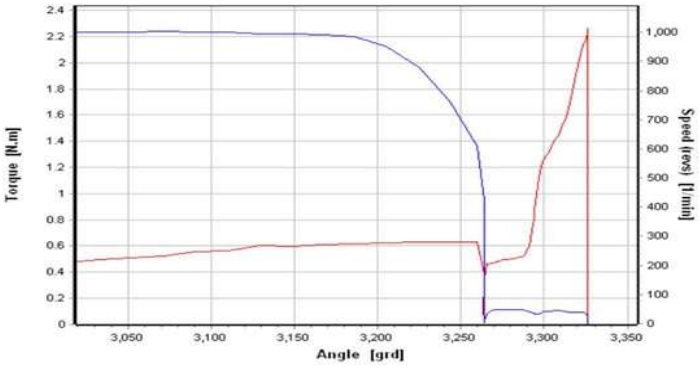
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	2,25	2,24	2,24	2,24	2,24	2,25	2,24	2,24	2,25	2,25
177718	3000015-05	32,00	31,00	30,00	30,00	30,00	30,00	31,00	30,00	29,00	30,00

Torque graphs

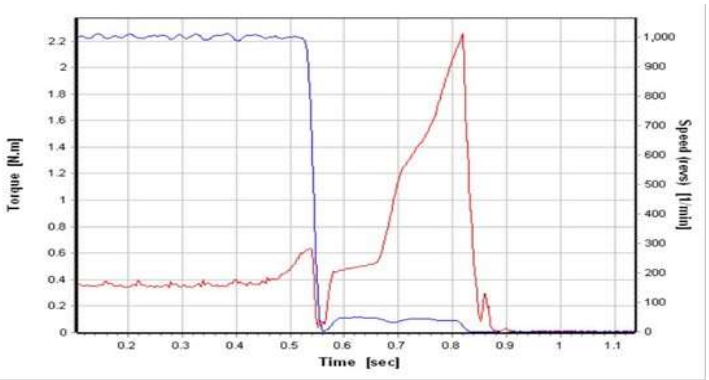
Machine Capability Study 30 %

Model: **CTBPW05Q**
Serial no: **GC0060**

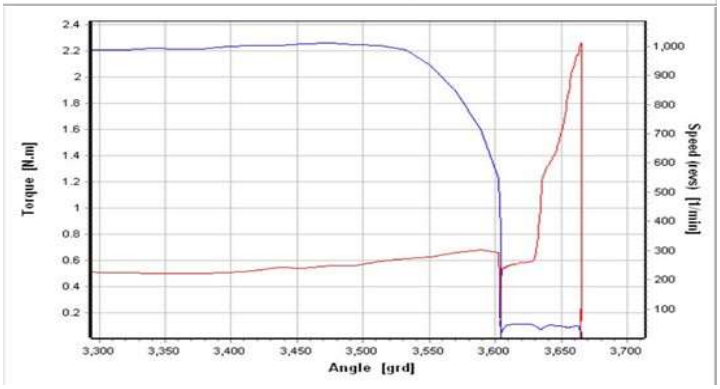
Angle degree: **30°**
Test torque: **2.2 Nm**



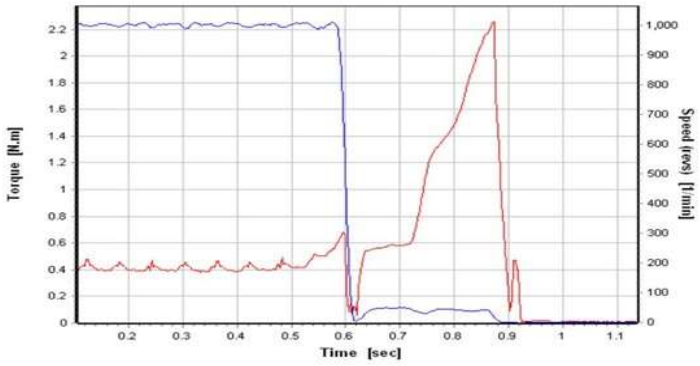
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Machine Capability Study
Control System

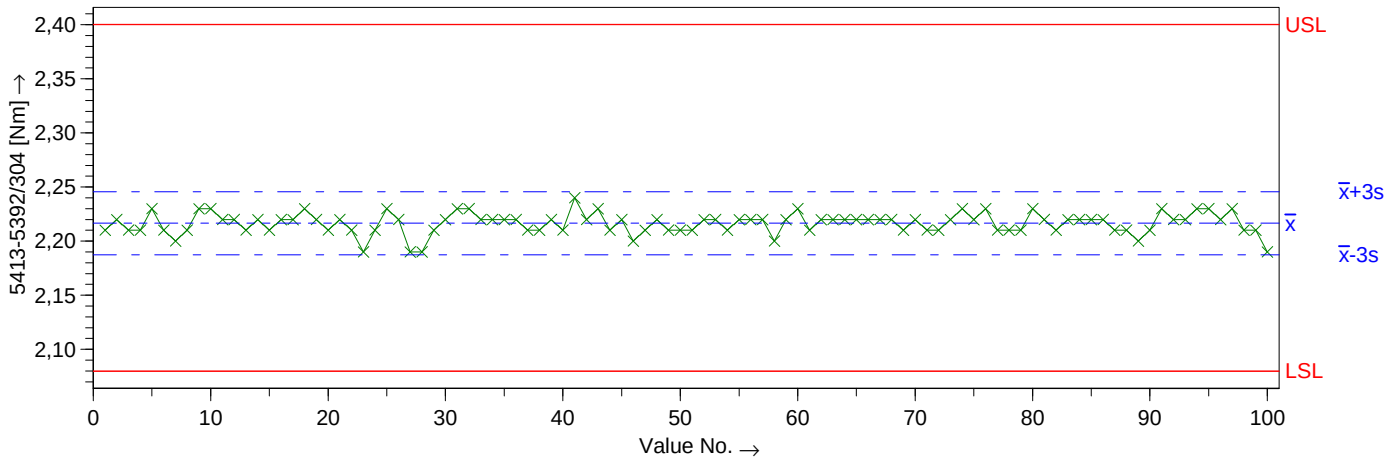
Cleco Production Tools

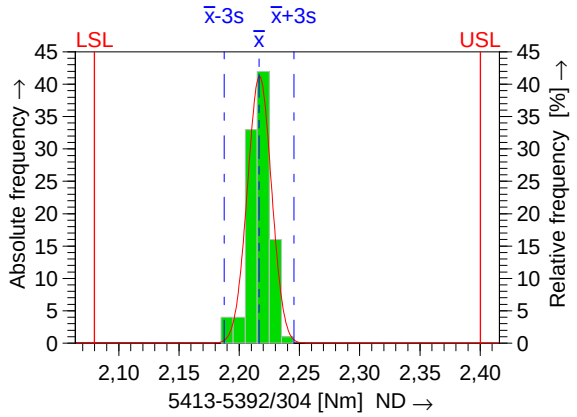
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	30.03.2021		

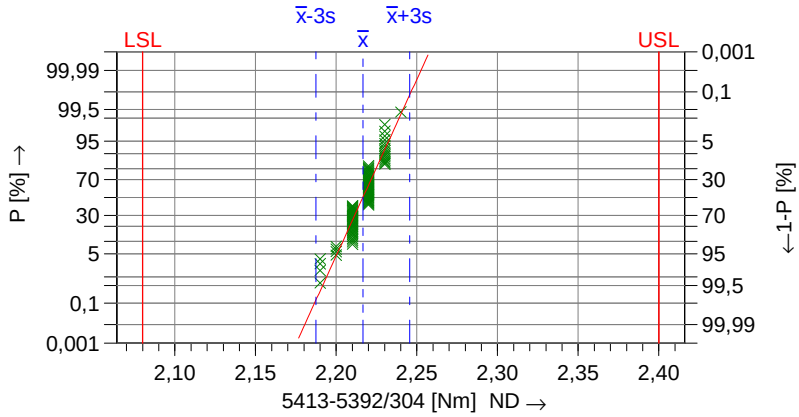
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060c	Char.Descr.	5413-5392/304	Inspection Val.	2,24	0,16	USL 2,40
		Serial No.	5376169	Unit	Nm	-0,16	LSL 2,08
Char.Type	variable			Tolerance value	7 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 30.03.2021 03:52:31 to 30.03.2021 04:22:13

Rem. TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;







Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2165
LSL	2.08	x_{min}	2.19	$\bar{x}$-3s	2.1875
USL	2.40	x_{max}	2.24	$\bar{x}$+3s	2.2455
T	0.32	R	0.05	6s	0.0581
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	5.51
Critical capability index	=	C_{mk}	4.70

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060c	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	2,21	2,22	2,21	2,21	2,23	2,21	2,20	2,21	2,23	2,23
5376169	5413-5392/304	390,50	355,00	388,75	352,25	350,75	373,75	380,50	376,00	353,50	378,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	2,22	2,22	2,21	2,22	2,21	2,22	2,22	2,23	2,22	2,21
5376169	5413-5392/304	348,25	383,25	356,25	352,75	340,00	364,25	357,00	344,00	377,50	389,25

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	2,22	2,21	2,19	2,21	2,23	2,22	2,19	2,19	2,21	2,22
5376169	5413-5392/304	359,25	348,00	363,50	341,00	353,50	398,75	377,25	363,25	371,25	368,75

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	2,23	2,23	2,22	2,22	2,22	2,22	2,21	2,21	2,22	2,21
5376169	5413-5392/304	349,50	334,75	355,25	357,25	393,75	390,50	358,75	370,00	390,50	315,50

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	2,24	2,22	2,23	2,21	2,22	2,20	2,21	2,22	2,21	2,21
5376169	5413-5392/304	342,50	366,75	352,75	379,50	357,75	378,00	363,50	388,25	323,25	303,25

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	2,21	2,22	2,22	2,21	2,22	2,22	2,22	2,20	2,22	2,23
5376169	5413-5392/304	348,25	331,00	324,00	362,25	382,75	372,00	370,25	331,50	343,75	349,25

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	2,21	2,22	2,22	2,22	2,22	2,22	2,22	2,22	2,21	2,22
5376169	5413-5392/304	367,25	337,00	354,75	357,00	359,50	368,25	335,50	321,75	356,75	364,25

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	2,21	2,21	2,22	2,23	2,22	2,23	2,21	2,21	2,21	2,23
5376169	5413-5392/304	376,00	348,50	351,25	341,75	369,50	329,50	370,75	340,75	361,25	350,00

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060c	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	2,22	2,21	2,22	2,22	2,22	2,22	2,21	2,21	2,20	2,21
5376169	5413-5392/304	352,00	392,25	382,75	376,00	352,25	324,00	344,25	391,75	322,25	349,00

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	2,23	2,22	2,22	2,23	2,23	2,22	2,23	2,21	2,21	2,19
5376169	5413-5392/304	351,00	381,25	398,75	334,75	368,25	356,75	347,25	371,00	354,00	356,50

Machine Capability Study
Tool System

Page 1 / 1

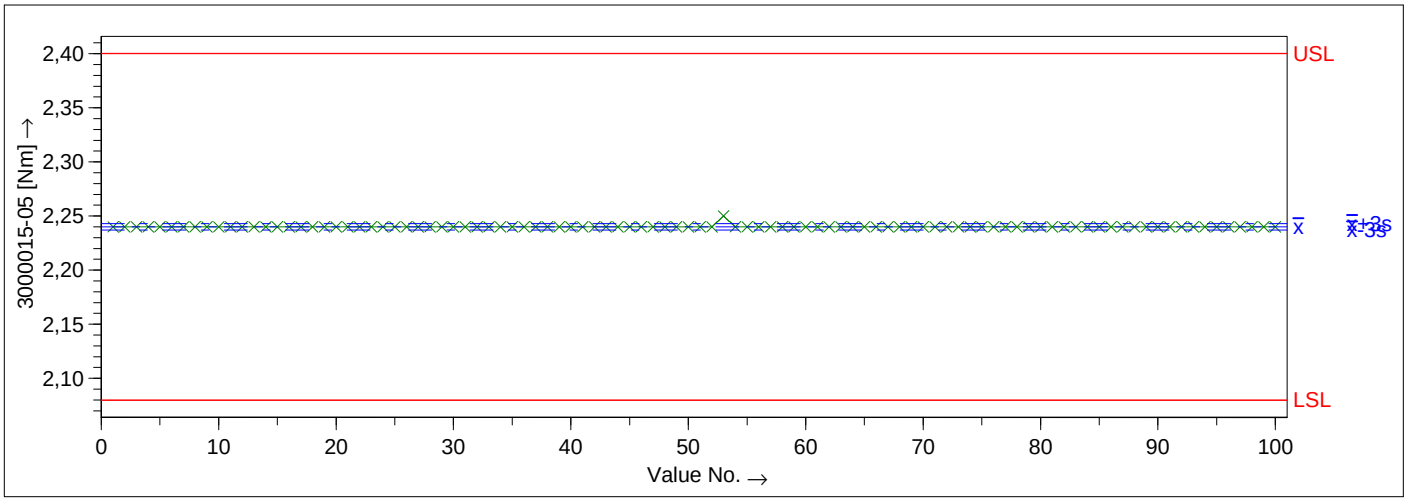
Plant ATG Lexington		Operator Name M. SHERMAN	Date 30.03.2021

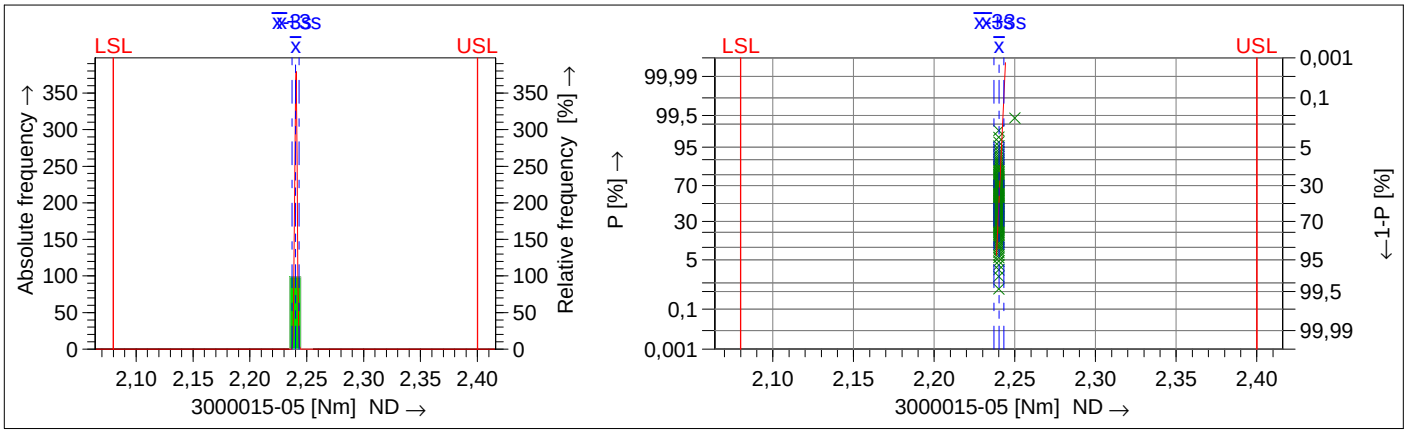
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060c	Char.Descr. 3000015-05	Inspection Val.	2,24	0,16	USL 2,40
	Serial No. 177718	Unit	Nm	-0,16	LSL 2,08
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2

Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100

Evaluation from 30.03.2021 15:52:32 to 30.03.2021 16:22:12

Rem. TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2401
LSL	2.08	x_{min}	2.24	$\bar{x}$-3s	2.2371
USL	2.40	x_{max}	2.25	$\bar{x}$+3s	2.2431
T	0.32	R	0.01	6s	0.0060
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	53.33
Critical capability index	=	C_{mk}	53.30

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060c	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	394,00	356,00	393,00	354,00	350,00	379,00	385,00	380,00	354,00	382,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	354,00	386,00	360,00	357,00	344,00	368,00	360,00	347,00	382,00	396,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	363,00	351,00	367,00	344,00	354,00	406,00	381,00	367,00	374,00	373,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	352,00	338,00	360,00	360,00	399,00	397,00	363,00	375,00	393,00	318,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	344,00	370,00	354,00	388,00	361,00	382,00	368,00	392,00	331,00	305,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	2,24	2,24	2,25	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	352,00	337,00	330,00	367,00	389,00	374,00	373,00	335,00	345,00	352,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	369,00	342,00	357,00	358,00	361,00	373,00	343,00	323,00	356,00	367,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	380,00	355,00	358,00	347,00	373,00	332,00	374,00	345,00	365,00	355,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060c	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	358,00	395,00	383,00	378,00	357,00	325,00	346,00	396,00	326,00	353,00

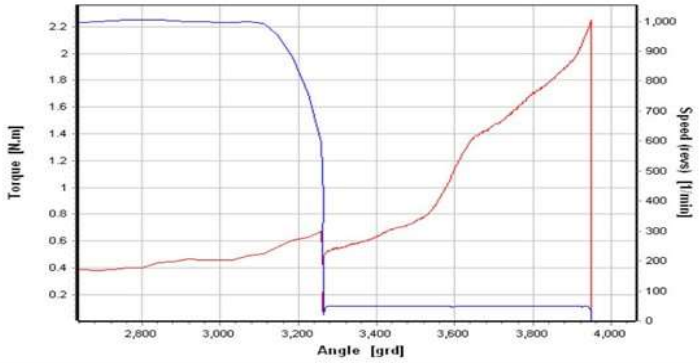
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177718	3000015-05	353,00	385,00	400,00	337,00	372,00	362,00	348,00	376,00	357,00	363,00

Torque graphs

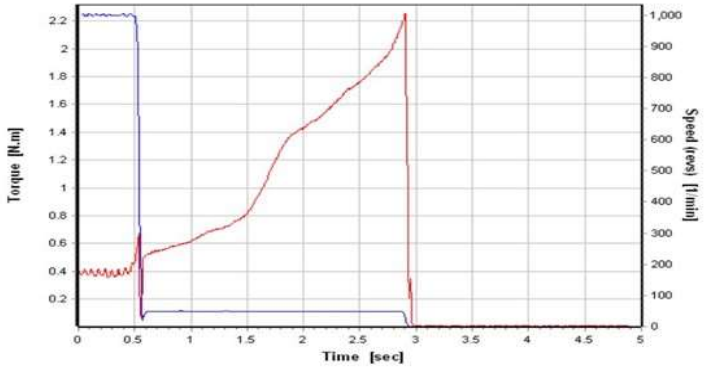
Machine Capability Study 30 %

Model: **CTBPW05Q**
Serial no: **GC0060**

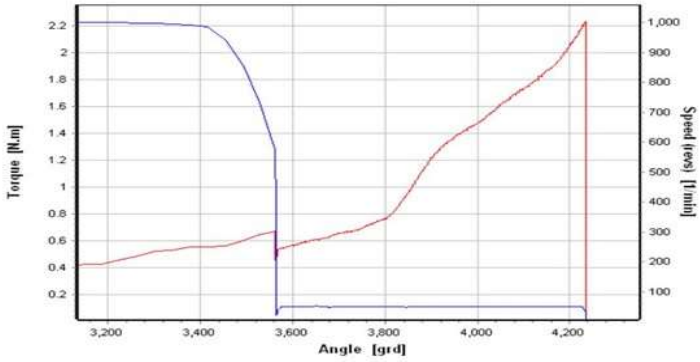
Angle degree: **360°**
Test torque: **2.2 Nm**



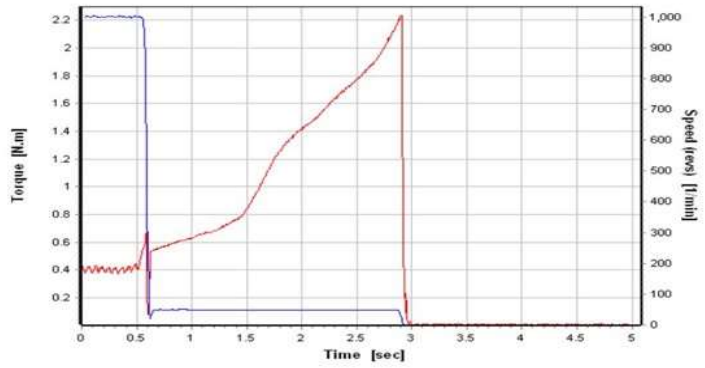
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Test sheet no. 3

Machine Capability Study 80 %

Multi-stage tightening system	☑	Speed 50 rpm	1.4 %
Single-stage tightening system	☐	Speed 100 %	3525 rpm

Manufacturer: Apex Tool Group Serial no: **GC0060**

Test torque: Tq min. + 0.8 (Tq max. - Tq min.) 4.14 Nm

Hard joint (H)	24.90 Nm / Revolution	Angle degree	30°
Soft joint (L)	2.06 Nm / Revolution	Angle degree	360°

		H	L
a)	Tolerance down / up	3.85 - 4.43 Nm	3.85 - 4.43 Nm
	Tolerance down / up	7 %	7 %
	Average torque	4.15 Nm	4.12 Nm
	Standard deviation	0.02 Nm	0.01 Nm
	Torque scatter (99,73%)	0.11 Nm	0.07 Nm
	C_m	5.40	8.51
	C_{mk}	5.21	7.95

b)	Min. C_m hard/soft (lowest value)	5.40
	Min. C_{mk} hard/soft (lowest value)	5.21

Capability is reached if minimum C_{mk} value ≥1.67

Note:

Machine Capability Study
Control System

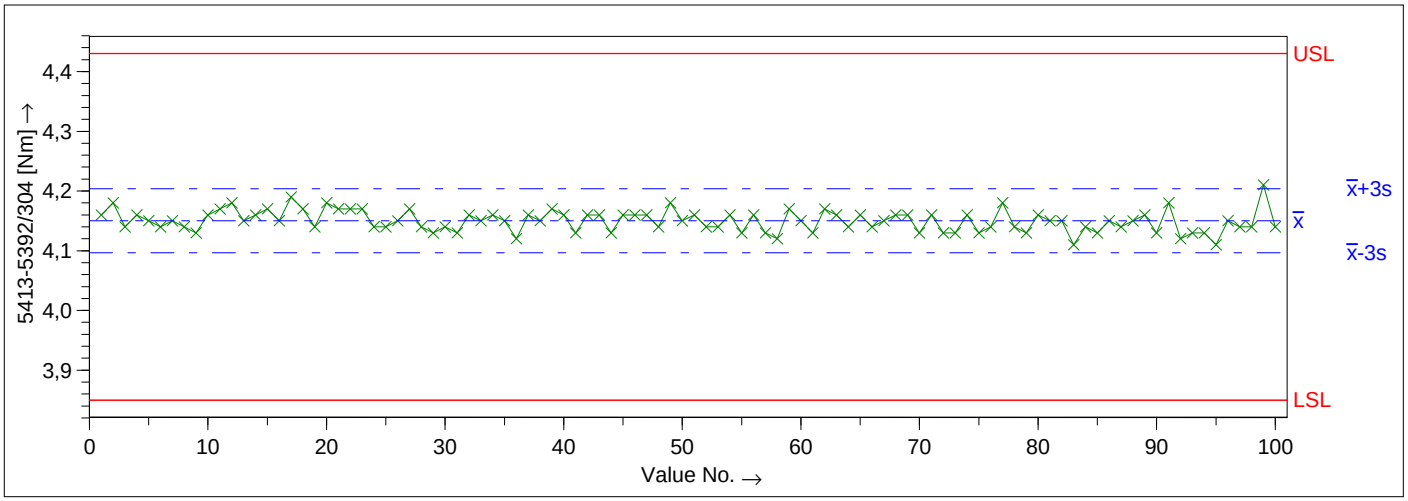
Page 1 / 1

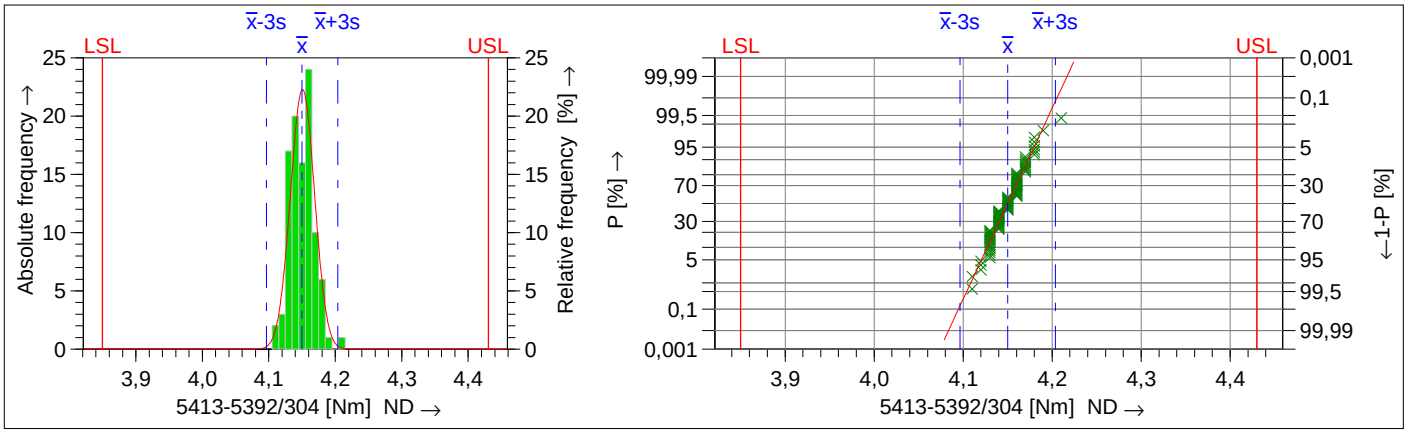
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	30.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0060h	Char.Descr.	5413-5392/304	Inspection Val. 4,14 0,29	USL 4,43
		Serial No.	5376169	Unit Nm -0,29	LSL 3,85
Char.Type	variable			Tolerance value 7 %	Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100

Evaluation from 30.03.2021 08:55:09 to 30.03.2021 09:24:50

Rem. TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1501
LSL	3.85	x_{min}	4.11	$\bar{x}$-3s	4.0964
USL	4.43	x_{max}	4.21	$\bar{x}$+3s	4.2038
T	0.58	R	0.10	6s	0.1074
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	5.40
Critical capability index	=	C_{mk}	5.21

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060h	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	4,16	4,18	4,14	4,16	4,15	4,14	4,15	4,14	4,13	4,16
5376169	5413-5392/304	29,50	30,25	30,75	30,25	30,75	30,25	30,25	29,75	29,75	30,25

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	4,17	4,18	4,15	4,16	4,17	4,15	4,19	4,17	4,14	4,18
5376169	5413-5392/304	30,25	32,00	30,00	30,75	30,50	30,25	29,75	30,00	30,00	29,75

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	4,17	4,17	4,17	4,14	4,14	4,15	4,17	4,14	4,13	4,14
5376169	5413-5392/304	30,00	31,25	31,25	29,50	31,50	29,50	31,50	29,00	30,25	31,50

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	4,13	4,16	4,15	4,16	4,15	4,12	4,16	4,15	4,17	4,16
5376169	5413-5392/304	29,00	31,50	29,50	29,75	29,50	29,50	31,00	29,25	31,50	29,75

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	4,13	4,16	4,16	4,13	4,16	4,16	4,16	4,14	4,18	4,15
5376169	5413-5392/304	31,25	29,50	29,75	29,50	30,00	30,25	31,75	29,50	31,00	30,75

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	4,16	4,14	4,14	4,16	4,13	4,16	4,13	4,12	4,17	4,15
5376169	5413-5392/304	29,50	29,75	29,50	30,50	31,50	29,50	30,00	31,25	30,50	30,50

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	4,13	4,17	4,16	4,14	4,16	4,14	4,15	4,16	4,16	4,13
5376169	5413-5392/304	29,50	31,00	30,00	30,00	30,00	31,75	29,75	29,75	31,25	29,75

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	4,16	4,13	4,13	4,16	4,13	4,14	4,18	4,14	4,13	4,16
5376169	5413-5392/304	31,50	30,25	31,25	29,75	30,25	31,25	29,75	30,50	29,75	29,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060h	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	4,15	4,15	4,11	4,14	4,13	4,15	4,14	4,15	4,16	4,13
5376169	5413-5392/304	31,25	30,00	30,00	29,75	30,00	30,50	31,25	29,25	31,75	30,00

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	4,18	4,12	4,13	4,13	4,11	4,15	4,14	4,14	4,21	4,14
5376169	5413-5392/304	30,25	30,00	30,00	30,00	30,00	31,25	30,00	31,00	30,50	31,50

Machine Capability Study
Tool System

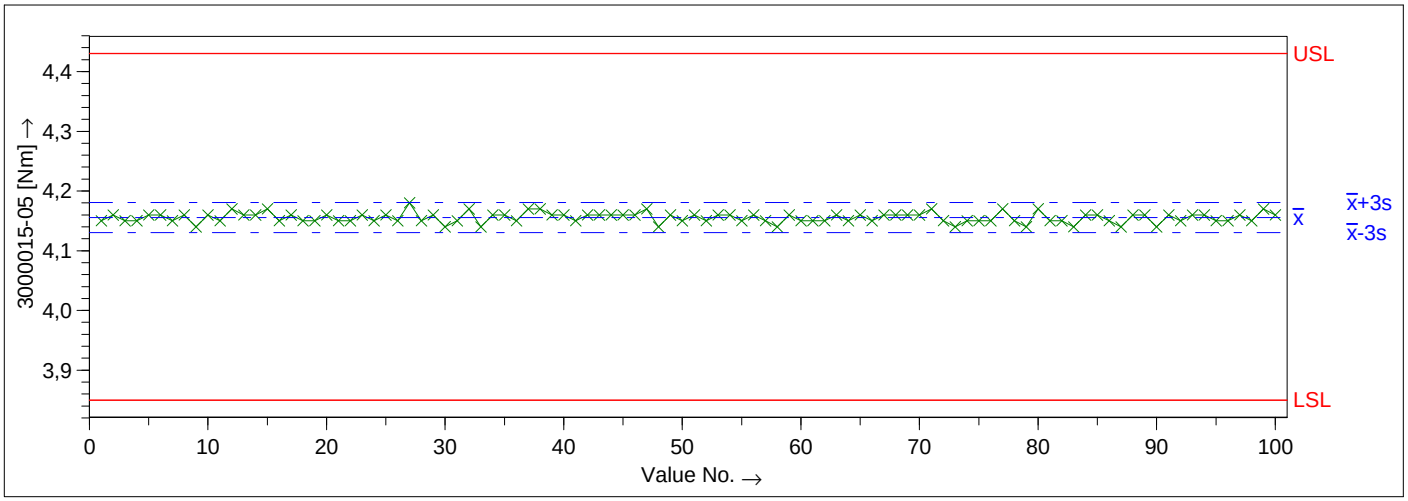
Page 1 / 1

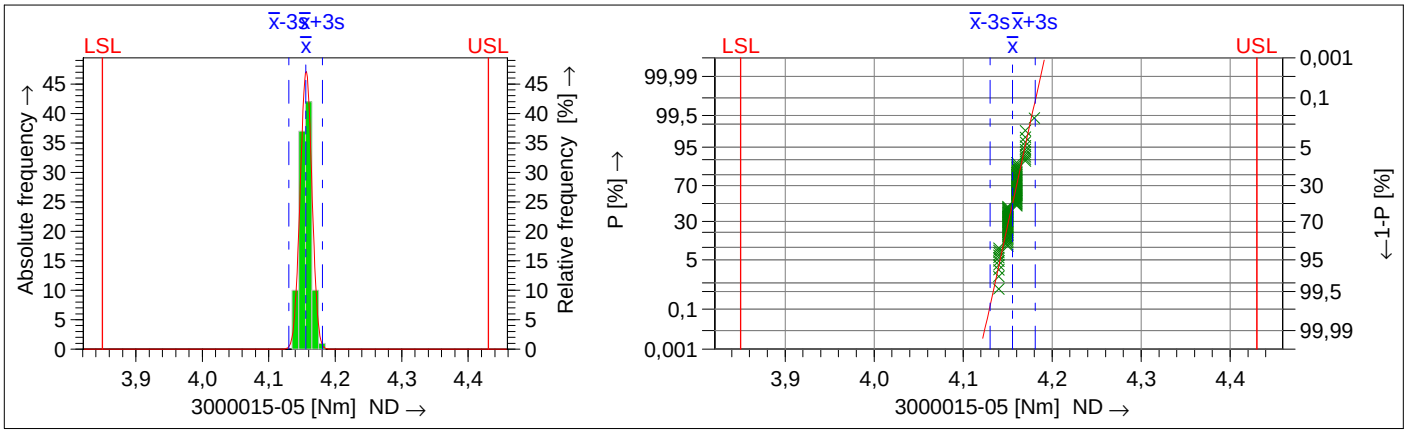
Plant ATG Lexington		Operator Name M. SHERMAN	Date 30.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060h	Char.Descr. 3000015-05	Inspection Val.	4,14	0,29	USL 4,43
	Serial No. 177718	Unit	Nm	-0,29	LSL 3,85
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 30.03.2021 08:55:09 to 30.03.2021 09:24:49

Rem. TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1555
LSL	3.85	x_{min}	4.14	$\bar{x}$-3s	4.1301
USL	4.43	x_{max}	4.18	$\bar{x}$+3s	4.1809
T	0.58	R	0.04	6s	0.0507
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	11.43
Critical capability index	=	C_{mk}	10.82

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Apex Tool Group \\htwe0006\AppData\QW\QWE\MessWert\2021\GC0060h1.DFD

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060h	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	4,15	4,16	4,15	4,15	4,16	4,16	4,15	4,16	4,14	4,16
177718	3000015-05	30,00	31,00	31,00	31,00	31,00	31,00	31,00	30,00	31,00	31,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	4,15	4,17	4,16	4,16	4,17	4,15	4,16	4,15	4,15	4,16
177718	3000015-05	31,00	32,00	31,00	32,00	31,00	31,00	30,00	31,00	30,00	30,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	4,15	4,15	4,16	4,15	4,16	4,15	4,18	4,15	4,16	4,14
177718	3000015-05	31,00	32,00	32,00	30,00	32,00	30,00	32,00	30,00	31,00	32,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	4,15	4,17	4,14	4,16	4,16	4,15	4,17	4,17	4,16	4,16
177718	3000015-05	30,00	32,00	30,00	30,00	30,00	30,00	32,00	30,00	32,00	30,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	4,15	4,16	4,16	4,16	4,16	4,16	4,17	4,14	4,16	4,15
177718	3000015-05	32,00	30,00	30,00	30,00	31,00	31,00	32,00	30,00	31,00	31,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	4,16	4,15	4,16	4,16	4,15	4,16	4,15	4,14	4,16	4,15
177718	3000015-05	30,00	30,00	30,00	31,00	32,00	30,00	31,00	32,00	31,00	31,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	4,15	4,15	4,16	4,15	4,16	4,15	4,16	4,16	4,16	4,16
177718	3000015-05	30,00	31,00	31,00	31,00	31,00	32,00	31,00	31,00	32,00	31,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	4,17	4,15	4,14	4,15	4,15	4,15	4,17	4,15	4,14	4,17
177718	3000015-05	32,00	31,00	32,00	30,00	30,00	32,00	30,00	31,00	30,00	30,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060h	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	4,15	4,15	4,14	4,16	4,16	4,15	4,14	4,16	4,16	4,14
177718	3000015-05	31,00	31,00	31,00	30,00	31,00	31,00	32,00	30,00	32,00	31,00

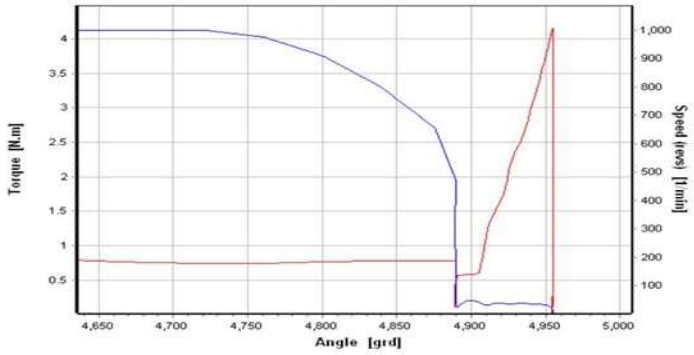
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	4,16	4,15	4,16	4,16	4,15	4,15	4,16	4,15	4,17	4,16
177718	3000015-05	31,00	31,00	31,00	31,00	31,00	32,00	30,00	31,00	31,00	32,00

Torque graphs

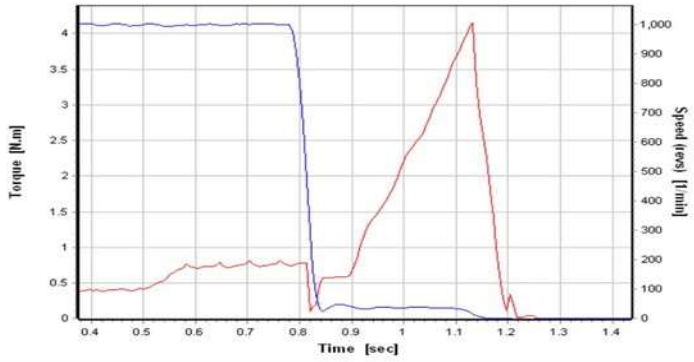
Machine Capability Study 80 %

Model: **CTBPW05Q**
Serial no: **GC0060**

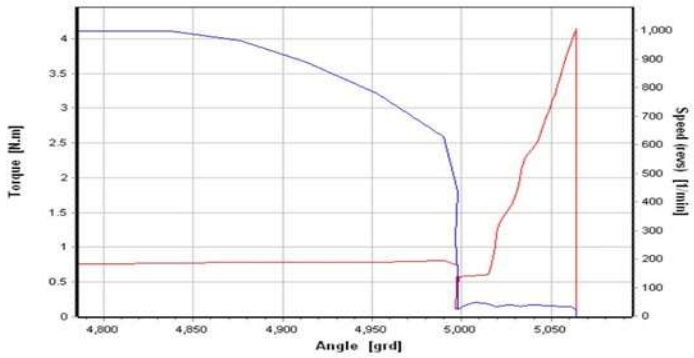
Angle degree: **30°**
Test torque: **4.1 Nm**



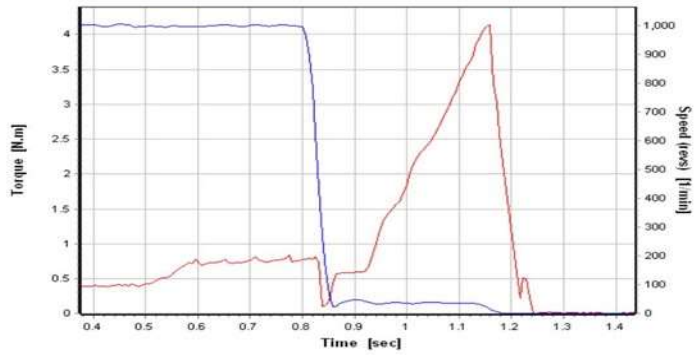
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Machine Capability Study
Control System

Cleco Production Tools

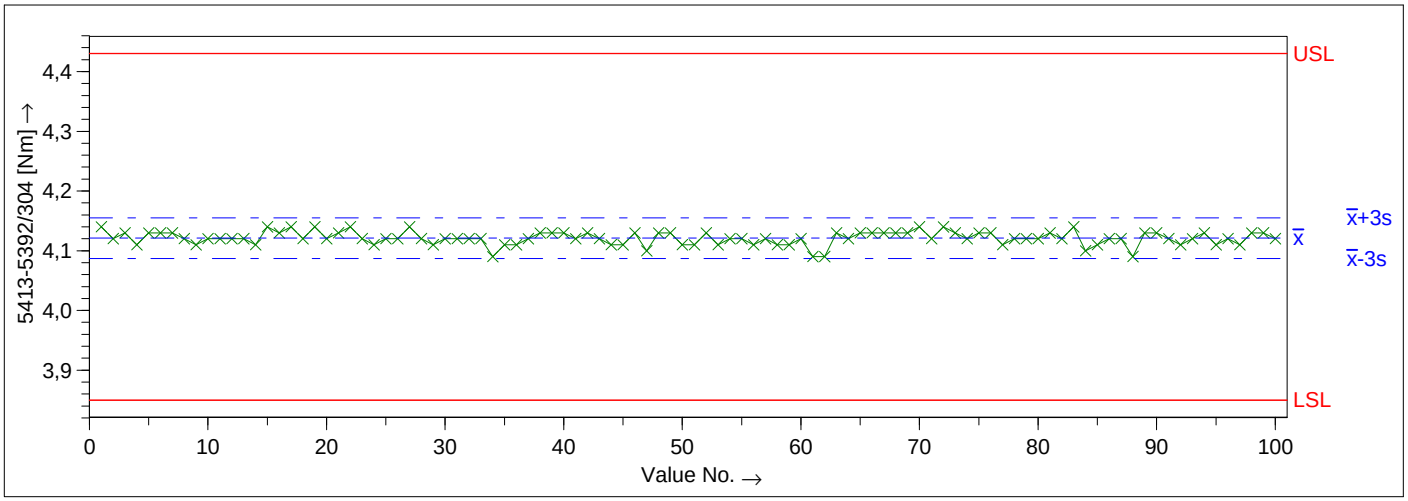
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	30.03.2021		

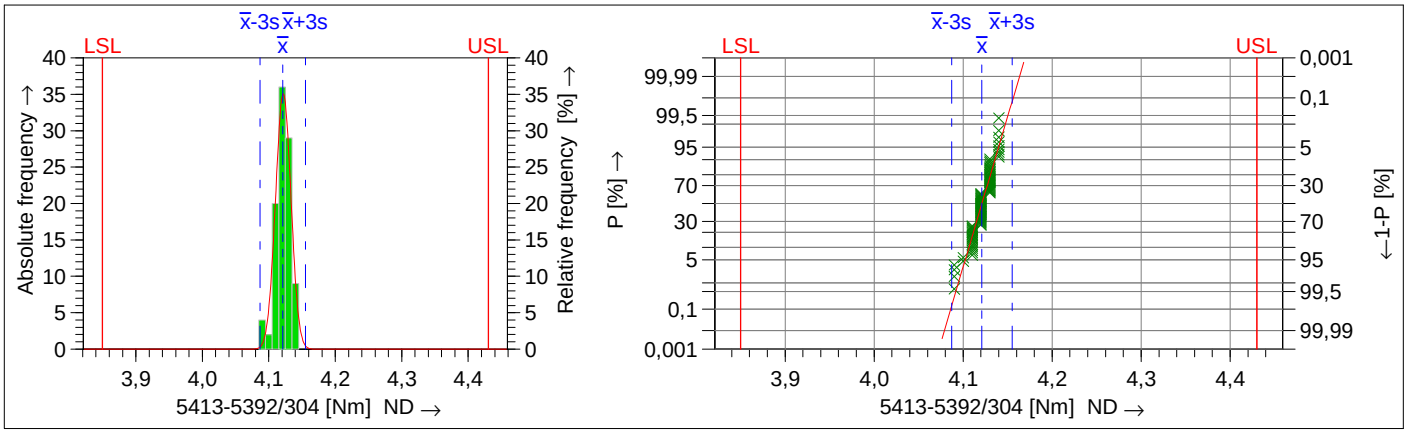
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060g	Char.Descr.	5413-5392/304	Inspection Val.	4,14	0,29	USL 4,43
		Serial No.	5376169	Unit	Nm	-0,29	LSL 3,85
Char.Type	variable			Tolerance value	7 %	Decimal Pl.	2

Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100

Evaluation from 30.03.2021 09:48:37 to 30.03.2021 10:59:36

Rem. TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1211
LSL	3.85	x_{min}	4.09	$\bar{x}$-3s	4.0870
USL	4.43	x_{max}	4.14	$\bar{x}$+3s	4.1552
T	0.58	R	0.05	6s	0.0682
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	8.51
Critical capability index	=	C_{mk}	7.95

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060g	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	4,14	4,12	4,13	4,11	4,13	4,13	4,13	4,12	4,11	4,12
5376169	5413-5392/304	355,50	358,00	374,00	361,50	360,25	365,75	364,75	370,75	367,25	366,50

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	4,12	4,12	4,12	4,11	4,14	4,13	4,14	4,12	4,14	4,12
5376169	5413-5392/304	365,50	370,25	366,50	348,50	367,25	373,00	372,75	357,50	347,75	350,25

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	4,13	4,14	4,12	4,11	4,12	4,12	4,14	4,12	4,11	4,12
5376169	5413-5392/304	359,75	363,00	367,25	347,25	365,25	363,50	369,75	361,50	356,50	366,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	4,12	4,12	4,12	4,09	4,11	4,11	4,12	4,13	4,13	4,13
5376169	5413-5392/304	345,75	345,00	359,00	354,00	364,25	362,25	369,75	370,00	360,75	367,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	4,12	4,13	4,12	4,11	4,11	4,13	4,10	4,13	4,13	4,11
5376169	5413-5392/304	372,25	362,00	357,75	366,50	350,00	355,75	355,00	364,00	371,00	356,50

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	4,11	4,13	4,11	4,12	4,12	4,11	4,12	4,11	4,11	4,12
5376169	5413-5392/304	367,75	355,25	368,25	370,75	360,25	348,50	358,50	346,75	354,00	373,75

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	4,09	4,09	4,13	4,12	4,13	4,13	4,13	4,13	4,13	4,14
5376169	5413-5392/304	359,75	356,25	363,00	349,00	353,75	373,75	372,50	373,00	360,75	373,75

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	4,12	4,14	4,13	4,12	4,13	4,13	4,11	4,12	4,12	4,12
5376169	5413-5392/304	363,25	366,25	355,25	353,50	354,50	364,00	354,25	349,50	364,50	351,00

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060g	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	4,13	4,12	4,14	4,10	4,11	4,12	4,12	4,09	4,13	4,13
5376169	5413-5392/304	350,25	348,75	363,25	342,75	365,00	367,50	354,50	356,50	353,75	348,25

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	4,12	4,11	4,12	4,13	4,11	4,12	4,11	4,13	4,13	4,12
5376169	5413-5392/304	344,50	367,25	360,50	351,00	348,75	344,00	340,75	364,00	370,50	356,50

Machine Capability Study
Tool System

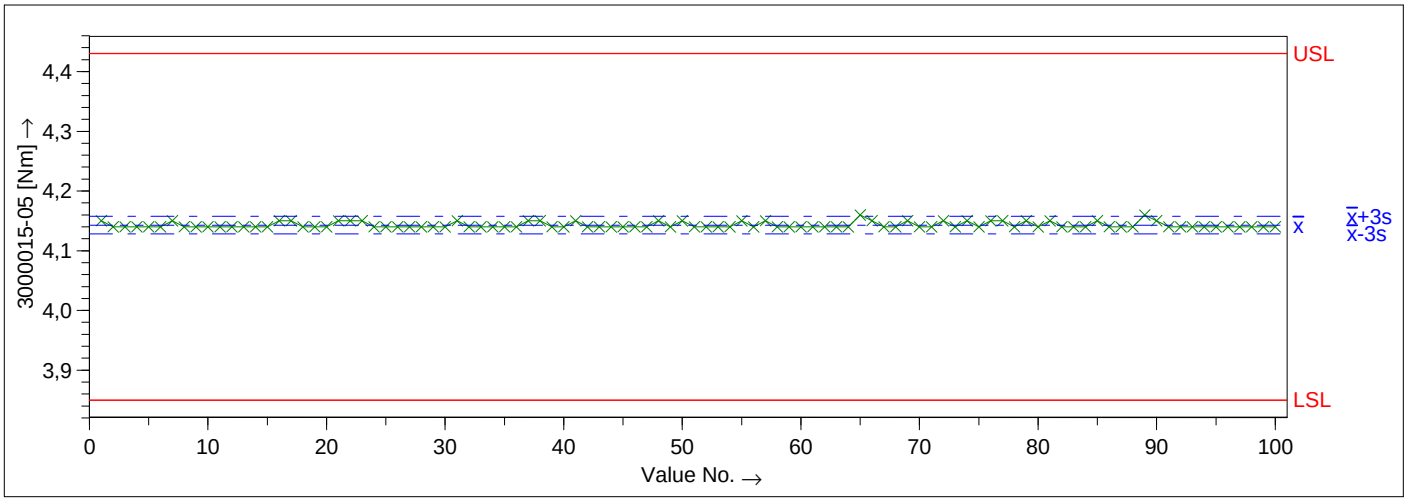
Page 1 / 1

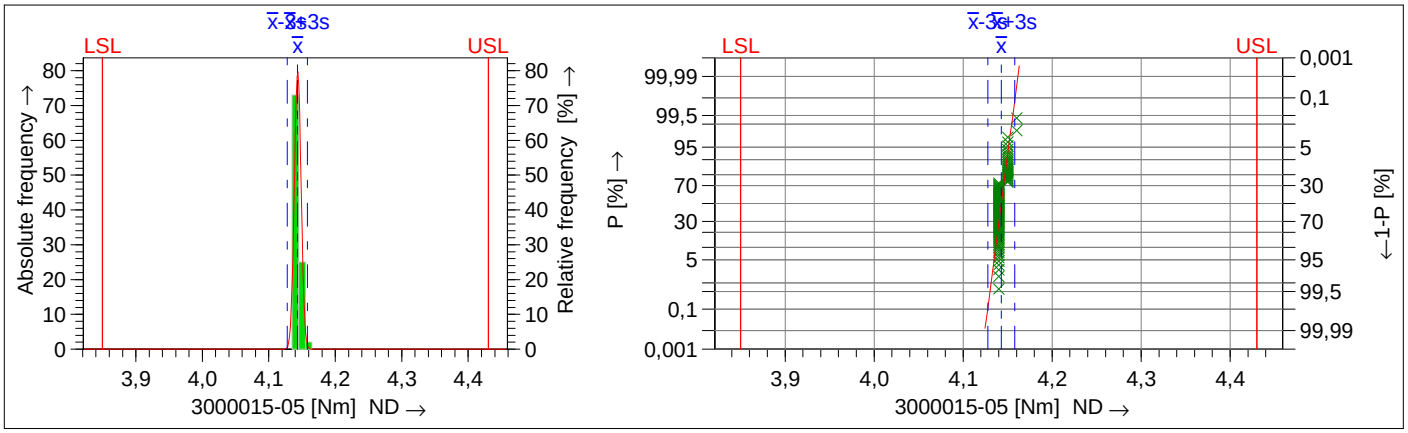
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	30.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060g	Char.Descr.	3000015-05	Inspection Val.	4,14	0,29	USL 4,43
		Serial No.	177718	Unit	Nm	-0,29	LSL 3,85
Char.Type	variable			Tolerance value	7 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 30.03.2021 09:48:35 to 30.03.2021 10:59:35

Rem. TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1429
LSL	3.85	x_{min}	4.14	$\bar{x}$-3s	4.1279
USL	4.43	x_{max}	4.16	$\bar{x}$+3s	4.1579
T	0.58	R	0.02	6s	0.0299
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	19.40
Critical capability index	=	C_{mk}	19.20

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060g	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	4,15	4,14	4,14	4,14	4,14	4,14	4,15	4,14	4,14	4,14
177718	3000015-05	359,00	360,00	373,00	372,00	369,00	366,00	370,00	374,00	371,00	374,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	4,14	4,14	4,14	4,14	4,14	4,15	4,15	4,14	4,14	4,14
177718	3000015-05	374,00	372,00	374,00	353,00	373,00	376,00	374,00	369,00	359,00	359,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	4,15	4,15	4,15	4,14	4,14	4,14	4,14	4,14	4,14	4,14
177718	3000015-05	364,00	365,00	372,00	353,00	368,00	364,00	372,00	368,00	359,00	368,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	4,15	4,14	4,14	4,14	4,14	4,14	4,15	4,15	4,14	4,14
177718	3000015-05	359,00	357,00	363,00	360,00	374,00	372,00	373,00	373,00	372,00	373,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	4,15	4,14	4,14	4,14	4,14	4,14	4,14	4,15	4,14	4,15
177718	3000015-05	380,00	367,00	363,00	372,00	353,00	360,00	364,00	369,00	374,00	364,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	4,14	4,14	4,14	4,14	4,15	4,14	4,15	4,14	4,14	4,14
177718	3000015-05	374,00	363,00	379,00	372,00	364,00	361,00	369,00	352,00	358,00	378,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	4,14	4,14	4,14	4,14	4,16	4,15	4,14	4,14	4,15	4,14
177718	3000015-05	372,00	366,00	369,00	358,00	360,00	377,00	374,00	378,00	369,00	377,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	4,14	4,15	4,14	4,15	4,14	4,15	4,15	4,14	4,15	4,14
177718	3000015-05	368,00	375,00	358,00	360,00	357,00	369,00	362,00	354,00	372,00	358,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060g	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.79 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	4,15	4,14	4,14	4,14	4,15	4,14	4,14	4,14	4,16	4,15
177718	3000015-05	358,00	356,00	370,00	354,00	367,00	373,00	366,00	368,00	360,00	360,00

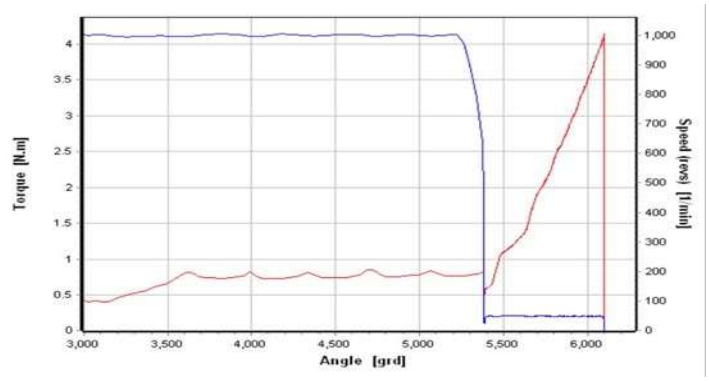
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	4,14	4,14	4,14	4,14	4,14	4,14	4,14	4,14	4,14	4,14
177718	3000015-05	352,00	371,00	367,00	361,00	359,00	347,00	347,00	366,00	376,00	367,00

Torque graphs

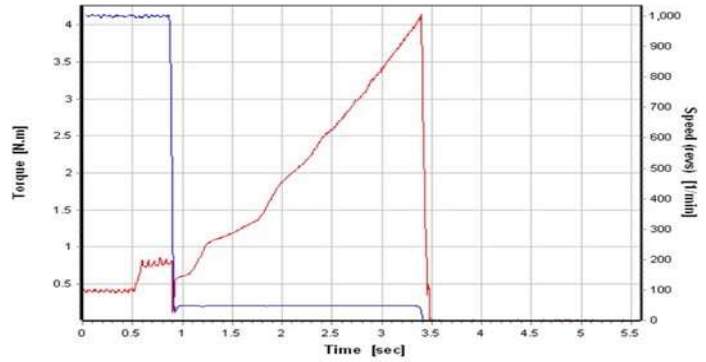
Machine Capability Study 80 %

Model: **CTBPW05Q**
Serial no: **GC0060**

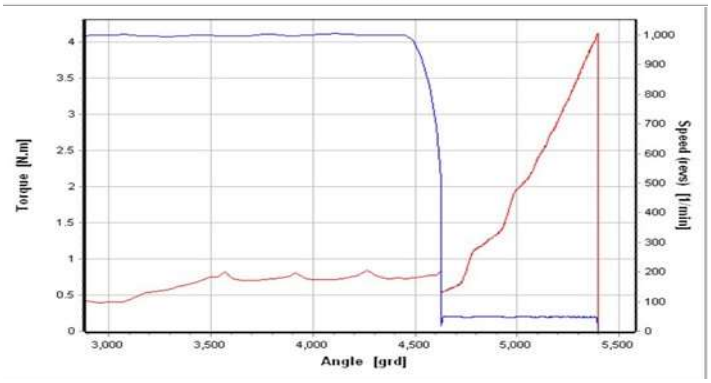
Angle degree: **360°**
Test torque: **4.1 Nm**



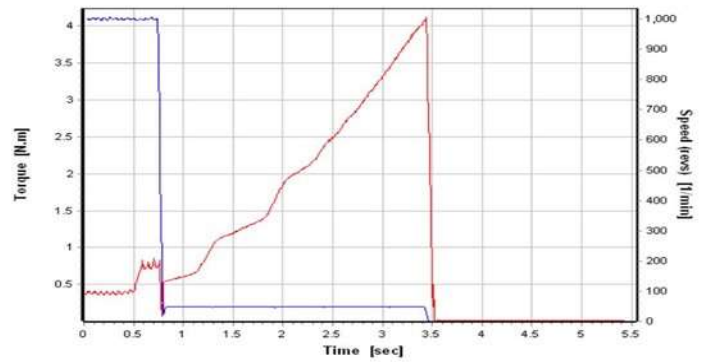
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Test sheet no. 4

Machine Capability Study 100 %

Multi-stage tightening system	☑	Speed 50 rpm	1.4 %
Single-stage tightening system	☐	Speed 100 %	3525 rpm

Manufacturer: Apex Tool Group Serial no: **GC0060**

Test torque: Tq max. 4.90 Nm

Hard joint (H)	29.56 Nm / Revolution	Angle degree	30°
Soft joint (L)	2.44 Nm / Revolution	Angle degree	360°

		H	L
a)	Tolerance down / up	4.56 - 5.24 Nm	4.56 - 5.24 Nm
	Tolerance down / up	7 %	7 %
	Average torque	4.93 Nm	4.88 Nm
	Standard deviation	0.03 Nm	0.01 Nm
	Torque scatter (99,73%)	0.16 Nm	0.09 Nm
	C_m	4.35	7.62
	C_{mk}	4.01	7.28

b) Min. C_m hard/soft (lowest value) 4.35
Min. C_{mk} hard/soft (lowest value) 4.01

Capability is reached if minimum C_{mk} value ≥1.67

Note:

Machine Capability Study
Control System

Page 1 / 1

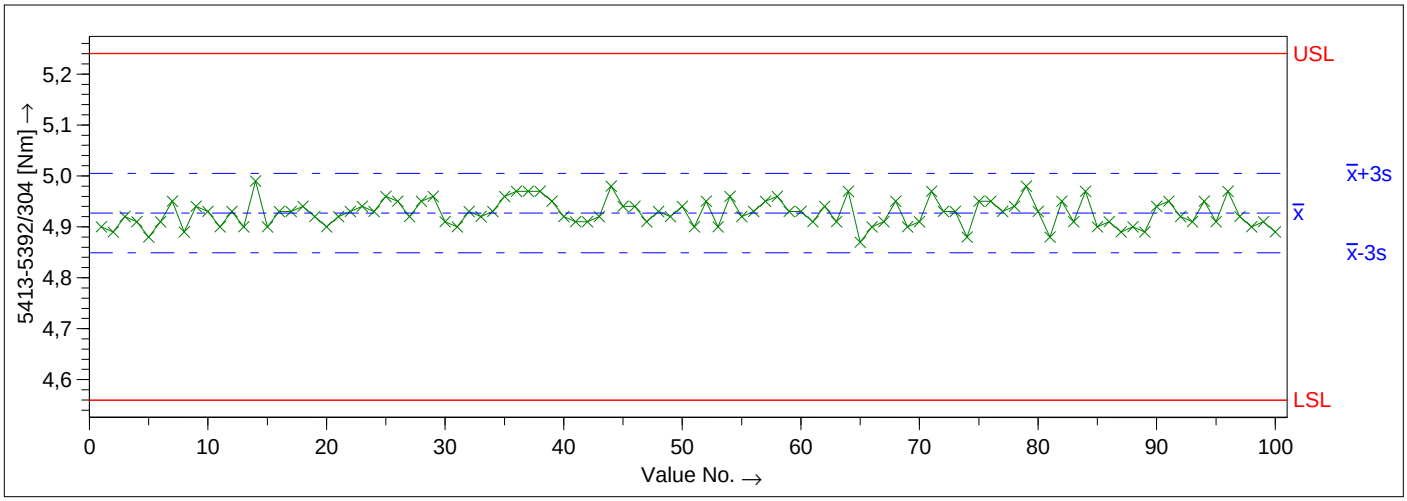
Plant ATG Lexington		Operator Name M. SHERMAN	Date 30.03.2021

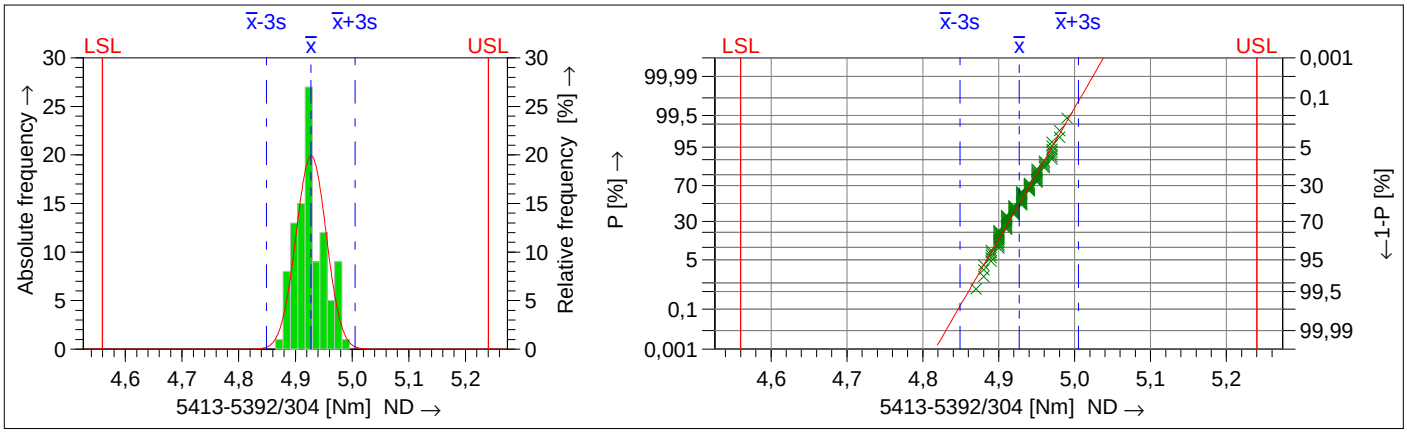
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060b	Char.Descr. 5413-5392/304	Inspection Val. 4,90	0,34	USL 5,24	
	Serial No. 5376169	Unit Nm	-0,34	LSL 4,56	
Char.Type variable		Tolerance value 7 %		Decimal Pl. 2	

Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100

Evaluation from 30.03.2021 11:14:57 to 30.03.2021 11:44:39

Rem. TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9271
LSL	4.56	x_{min}	4.87	$\bar{x}$-3s	4.8490
USL	5.24	x_{max}	4.99	$\bar{x}$+3s	5.0052
T	0.68	R	0.12	6s	0.1562
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	4.35
Critical capability index	=	C_{mk}	4.01

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060b	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	4,90	4,89	4,92	4,91	4,88	4,91	4,95	4,89	4,94	4,93
5376169	5413-5392/304	30,00	30,00	30,00	29,25	29,75	29,50	29,75	30,50	30,25	30,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	4,90	4,93	4,90	4,99	4,90	4,93	4,93	4,94	4,92	4,90
5376169	5413-5392/304	30,00	29,50	30,75	30,75	29,75	30,75	29,75	31,00	30,50	30,50

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	4,92	4,93	4,94	4,93	4,96	4,95	4,92	4,95	4,96	4,91
5376169	5413-5392/304	29,75	31,00	30,75	29,50	30,00	31,00	30,50	29,50	30,25	30,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	4,90	4,93	4,92	4,93	4,96	4,97	4,97	4,97	4,95	4,92
5376169	5413-5392/304	29,25	29,75	31,00	30,00	30,25	30,75	30,00	31,50	30,00	30,75

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	4,91	4,91	4,92	4,98	4,94	4,94	4,91	4,93	4,92	4,94
5376169	5413-5392/304	31,00	29,50	29,75	30,75	30,25	31,00	30,75	30,50	30,25	30,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	4,90	4,95	4,90	4,96	4,92	4,93	4,95	4,96	4,93	4,93
5376169	5413-5392/304	30,50	30,25	30,50	29,75	30,25	30,25	29,75	30,00	30,00	30,50

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	4,91	4,94	4,91	4,97	4,87	4,90	4,91	4,95	4,90	4,91
5376169	5413-5392/304	30,25	30,75	30,75	29,75	29,50	30,50	31,00	30,25	30,75	30,25

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	4,97	4,93	4,93	4,88	4,95	4,95	4,93	4,94	4,98	4,93
5376169	5413-5392/304	29,75	31,25	29,25	29,50	30,50	30,25	30,50	30,00	30,50	30,50

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060b	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	4,88	4,95	4,91	4,97	4,90	4,91	4,89	4,90	4,89	4,94
5376169	5413-5392/304	29,25	30,75	30,50	30,25	30,25	30,50	30,25	29,75	30,75	30,75

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	4,95	4,92	4,91	4,95	4,91	4,97	4,92	4,90	4,91	4,89
5376169	5413-5392/304	30,50	29,75	30,75	30,50	31,00	31,00	30,25	30,75	29,75	30,00

Machine Capability Study
Tool System

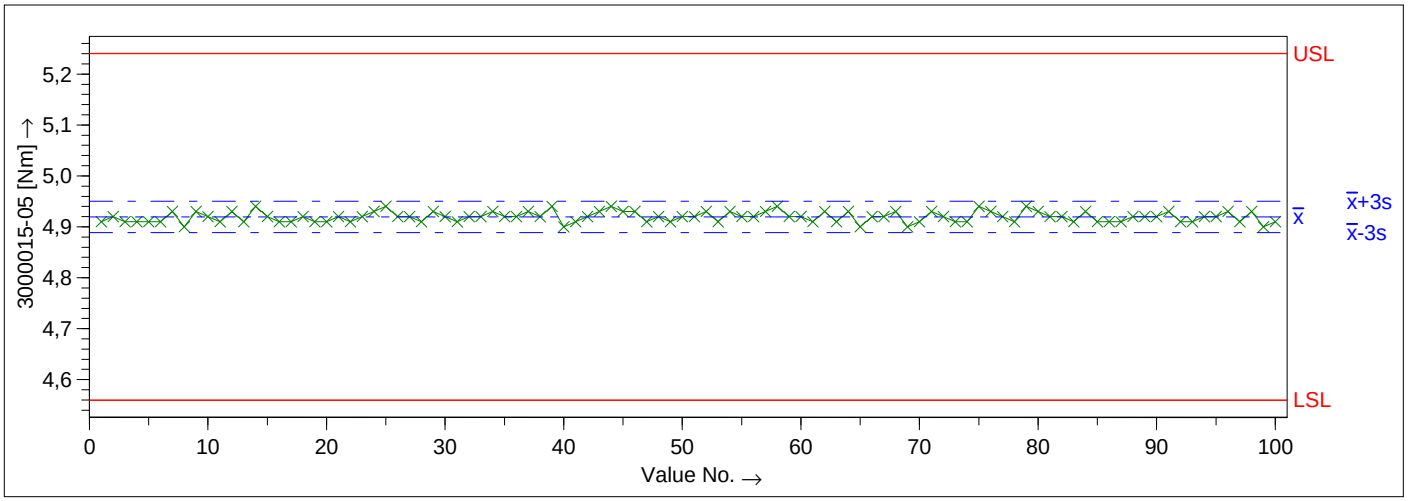
Page 1 / 1

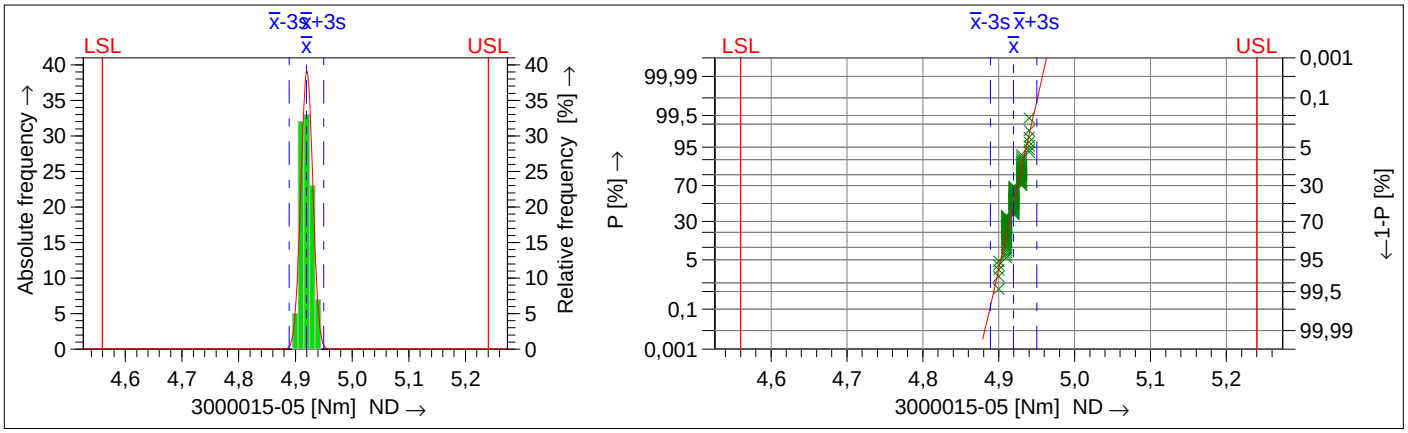
Plant ATG Lexington		Operator Name M. SHERMAN	Date 30.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060b	Char.Descr. 3000015-05	Inspection Val.	4,90	0,34	USL 5,24
	Serial No. 177718	Unit	Nm	-0,34	LSL 4,56
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 30.03.2021 11:14:56 to 30.03.2021 11:44:38

Rem. TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9195
LSL	4.56	x_{min}	4.90	$\bar{x}$-3s	4.8889
USL	5.24	x_{max}	4.94	$\bar{x}$+3s	4.9501
T	0.68	R	0.04	6s	0.0611
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	11.12
Critical capability index	=	C_{mk}	10.49

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060b	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	4,91	4,92	4,91	4,91	4,91	4,91	4,93	4,90	4,93	4,92
177718	3000015-05	31,00	31,00	31,00	30,00	31,00	30,00	31,00	31,00	31,00	31,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	4,91	4,93	4,91	4,94	4,92	4,91	4,91	4,92	4,91	4,91
177718	3000015-05	30,00	30,00	31,00	32,00	31,00	32,00	31,00	32,00	31,00	31,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	4,92	4,91	4,92	4,93	4,94	4,92	4,92	4,91	4,93	4,92
177718	3000015-05	31,00	32,00	32,00	31,00	31,00	32,00	31,00	30,00	31,00	31,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	4,91	4,92	4,92	4,93	4,92	4,92	4,93	4,92	4,94	4,90
177718	3000015-05	30,00	31,00	32,00	31,00	31,00	32,00	31,00	32,00	31,00	32,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	4,91	4,92	4,93	4,94	4,93	4,93	4,91	4,92	4,91	4,92
177718	3000015-05	31,00	31,00	31,00	31,00	31,00	32,00	31,00	32,00	31,00	31,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	4,92	4,93	4,91	4,93	4,92	4,92	4,93	4,94	4,92	4,92
177718	3000015-05	31,00	31,00	31,00	31,00	31,00	31,00	31,00	31,00	31,00	32,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	4,91	4,93	4,91	4,93	4,90	4,92	4,92	4,93	4,90	4,91
177718	3000015-05	31,00	31,00	31,00	31,00	31,00	31,00	31,00	31,00	32,00	31,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	4,93	4,92	4,91	4,91	4,94	4,93	4,92	4,91	4,94	4,93
177718	3000015-05	31,00	32,00	31,00	31,00	31,00	32,00	31,00	31,00	32,00	31,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060b	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	4,92	4,92	4,91	4,93	4,91	4,91	4,91	4,92	4,92	4,92
177718	3000015-05	31,00	32,00	31,00	32,00	31,00	31,00	31,00	31,00	31,00	32,00

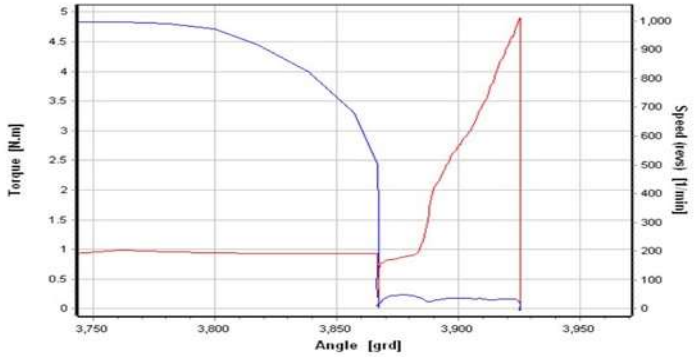
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	4,93	4,91	4,91	4,92	4,92	4,93	4,91	4,93	4,90	4,91
177718	3000015-05	31,00	31,00	32,00	31,00	32,00	32,00	31,00	32,00	30,00	31,00

Torque graphs

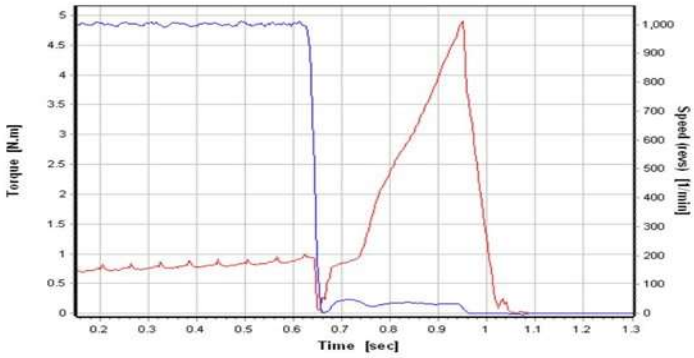
Machine Capability Study 100 %

Model: **CTBPW05Q**
Serial no: **GC0060**

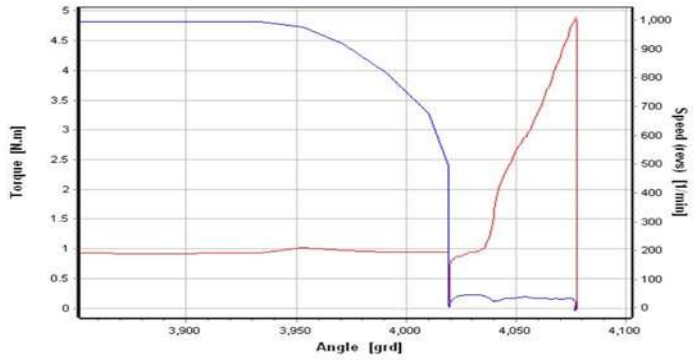
Angle degree: **30°**
Test torque: **4.9 Nm**



Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



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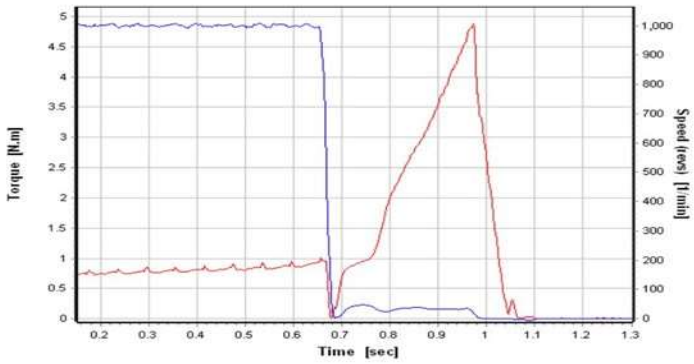
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Machine Capability Study
Control System

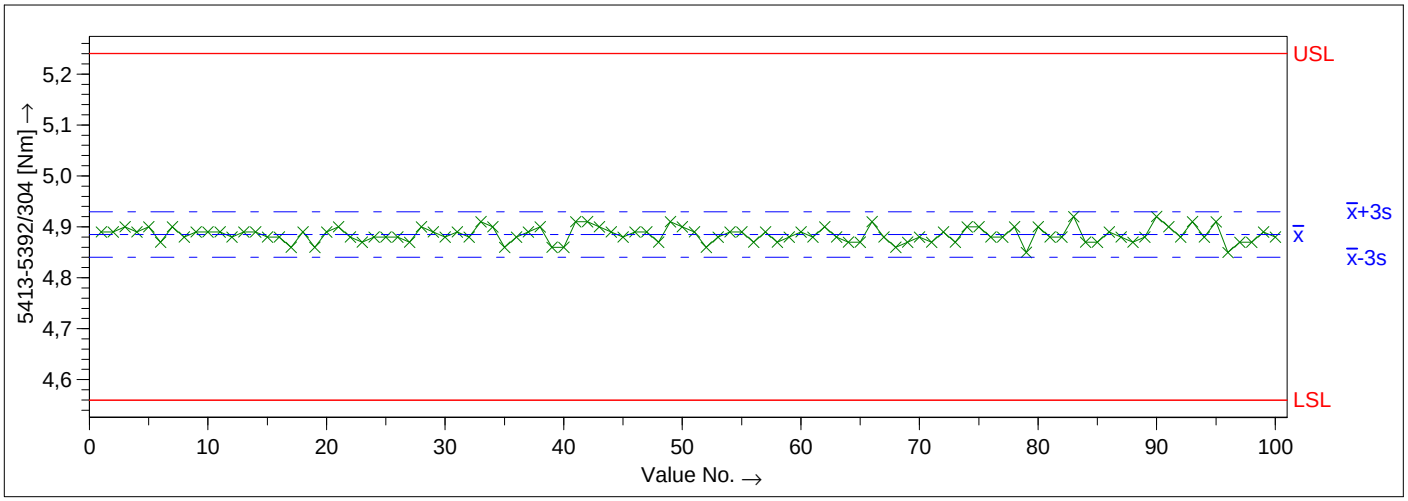
Page 1 / 1

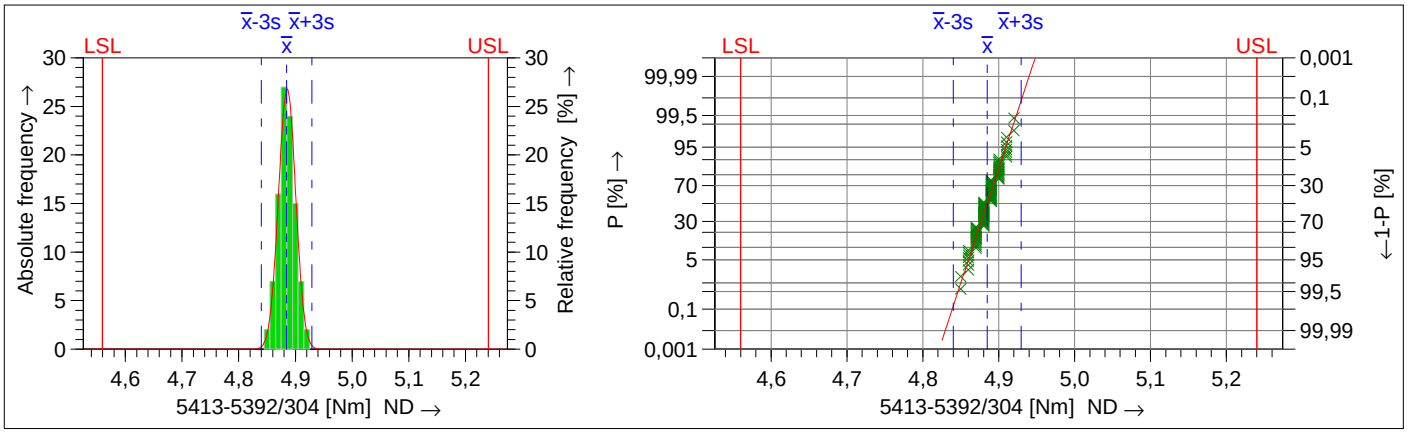
Plant ATG Lexington		Operator Name M. SHERMAN	Date 30.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060a	Char.Descr. 5413-5392/304	Inspection Val.	4,90	0,34	USL 5,24
	Serial No. 5376169	Unit	Nm	-0,34	LSL 4,56
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 30.03.2021 11:52:17 to 30.03.2021 01:19:43

Rem. TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.8847
LSL	4.56	x_{min}	4.85	$\bar{x}$-3s	4.8401
USL	5.24	x_{max}	4.92	$\bar{x}$+3s	4.9293
T	0.68	R	0.07	6s	0.0892
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1,4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	7.62
Critical capability index	=	C_{mk}	7.28

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060a	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	4,89	4,89	4,90	4,89	4,90	4,87	4,90	4,88	4,89	4,89
5376169	5413-5392/304	356,75	357,00	360,25	360,50	361,00	360,25	361,75	358,50	361,75	362,25

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	4,89	4,88	4,89	4,89	4,88	4,88	4,86	4,89	4,86	4,89
5376169	5413-5392/304	360,75	363,25	357,25	362,75	360,75	363,25	354,75	361,00	362,75	364,50

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	4,90	4,88	4,87	4,88	4,88	4,88	4,87	4,90	4,89	4,88
5376169	5413-5392/304	363,50	360,50	356,75	357,50	365,25	357,25	359,75	359,00	357,75	362,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	4,89	4,88	4,91	4,90	4,86	4,88	4,89	4,90	4,86	4,86
5376169	5413-5392/304	364,00	360,00	364,25	353,75	357,50	361,25	360,75	360,75	358,25	351,50

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	4,91	4,91	4,90	4,89	4,88	4,89	4,89	4,87	4,91	4,90
5376169	5413-5392/304	363,75	366,25	361,00	361,50	362,50	363,75	367,50	358,25	362,25	358,50

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	4,89	4,86	4,88	4,89	4,89	4,87	4,89	4,87	4,88	4,89
5376169	5413-5392/304	359,00	360,75	363,75	363,25	359,50	362,75	360,00	362,25	361,25	365,50

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	4,88	4,90	4,88	4,87	4,87	4,91	4,88	4,86	4,87	4,88
5376169	5413-5392/304	357,25	362,00	362,00	356,50	362,50	367,75	359,00	358,00	360,75	359,25

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	4,87	4,89	4,87	4,90	4,90	4,88	4,88	4,90	4,85	4,90
5376169	5413-5392/304	354,75	360,50	360,75	362,50	366,25	359,00	363,25	362,00	356,00	361,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060a	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	4,88	4,88	4,92	4,87	4,87	4,89	4,88	4,87	4,88	4,92
5376169	5413-5392/304	362,00	363,50	361,00	363,25	356,25	360,50	356,75	355,75	363,50	364,25

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	4,90	4,88	4,91	4,88	4,91	4,85	4,87	4,87	4,89	4,88
5376169	5413-5392/304	360,75	356,50	358,75	359,75	366,00	358,50	358,25	355,50	361,75	363,25

Machine Capability Study
Tool System

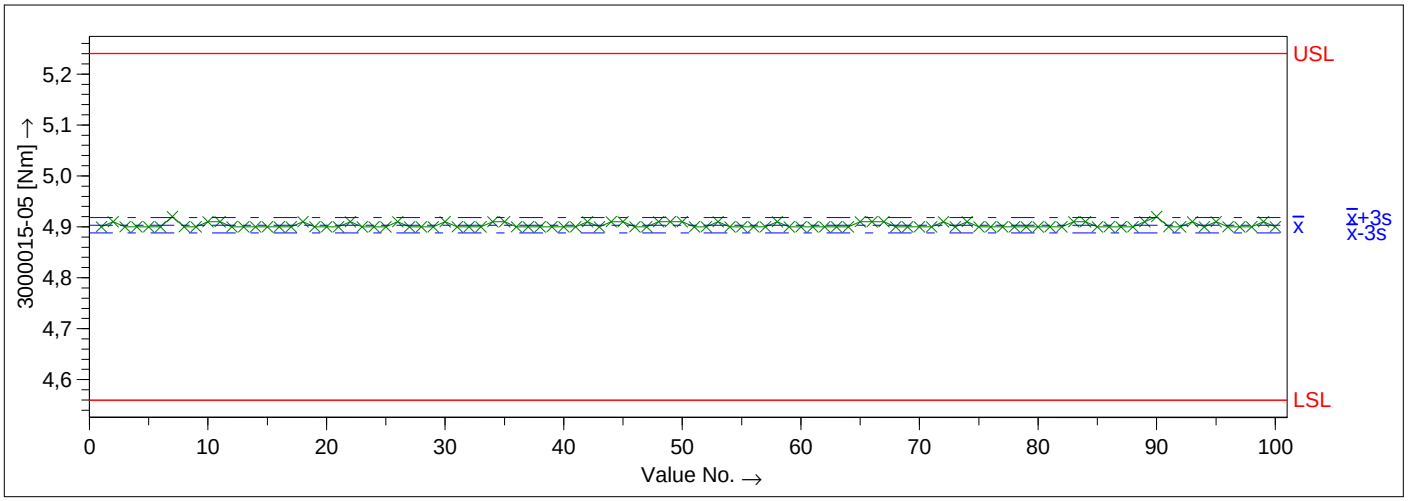
Page 1 / 1

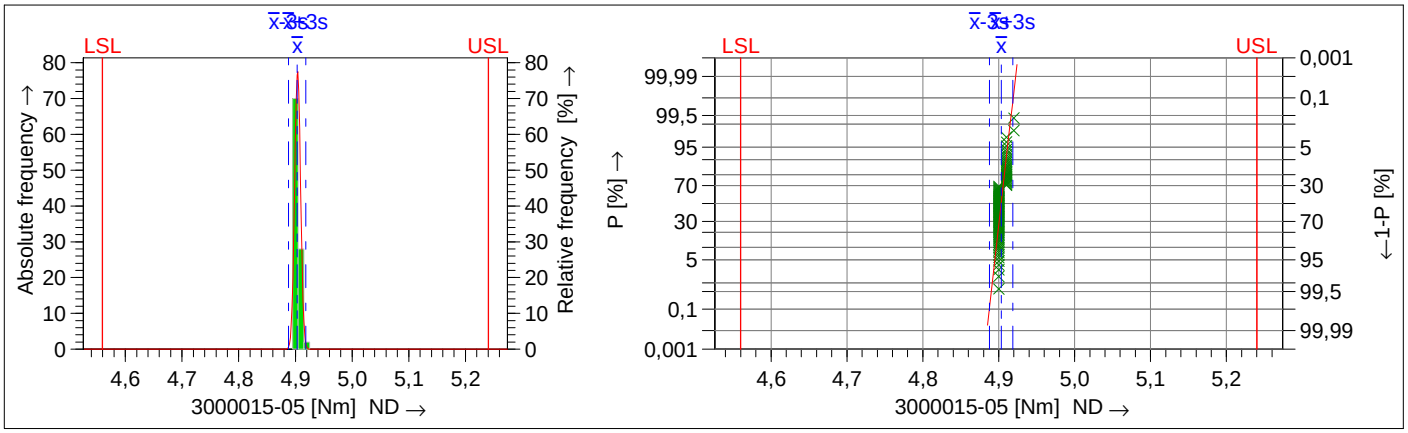
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	30.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0060a	Char.Descr.	3000015-05	Inspection Val. 4,90 0,34	USL 5,24
		Serial No.	177718	Unit Nm -0,34	LSL 4,56
Char.Type	variable			Tolerance value 7 %	Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100

Evaluation from 30.03.2021 11:52:16 to 30.03.2021 13:19:42

Rem. TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9032
LSL	4.56	x_{min}	4.90	$\bar{x}$-3s	4.8879
USL	5.24	x_{max}	4.92	$\bar{x}$+3s	4.9185
T	0.68	R	0.02	6s	0.0306
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			M1 1.4 $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	22.22
Critical capability index	=	C_{mk}	22.01

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060a	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	4,90	4,91	4,90	4,90	4,90	4,90	4,92	4,90	4,90	4,91
177718	3000015-05	363,00	367,00	362,00	370,00	365,00	365,00	369,00	366,00	366,00	368,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	4,91	4,90	4,90	4,90	4,90	4,90	4,90	4,91	4,90	4,90
177718	3000015-05	367,00	368,00	361,00	369,00	366,00	369,00	358,00	366,00	365,00	368,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	4,90	4,91	4,90	4,90	4,90	4,91	4,90	4,90	4,90	4,91
177718	3000015-05	369,00	367,00	363,00	368,00	370,00	369,00	365,00	363,00	368,00	369,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	4,90	4,90	4,90	4,91	4,91	4,90	4,90	4,90	4,90	4,90
177718	3000015-05	370,00	367,00	370,00	361,00	365,00	367,00	368,00	369,00	365,00	358,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	4,90	4,91	4,90	4,91	4,91	4,90	4,90	4,91	4,91	4,91
177718	3000015-05	368,00	371,00	367,00	371,00	369,00	369,00	370,00	366,00	367,00	363,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	4,90	4,90	4,91	4,90	4,90	4,90	4,90	4,91	4,90	4,90
177718	3000015-05	361,00	365,00	370,00	368,00	370,00	370,00	367,00	369,00	367,00	373,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	4,90	4,90	4,90	4,90	4,91	4,91	4,91	4,90	4,90	4,90
177718	3000015-05	362,00	369,00	367,00	362,00	366,00	371,00	367,00	362,00	365,00	361,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	4,90	4,91	4,90	4,91	4,90	4,90	4,90	4,90	4,90	4,90
177718	3000015-05	367,00	369,00	368,00	371,00	372,00	363,00	366,00	364,00	361,00	372,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 30.03.2021

Ser.No.	GC0060a	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.78 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 1000-50 RPM;				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	4,90	4,90	4,91	4,91	4,90	4,90	4,90	4,90	4,91	4,92
177718	3000015-05	368,00	369,00	371,00	368,00	365,00	367,00	362,00	363,00	368,00	371,00

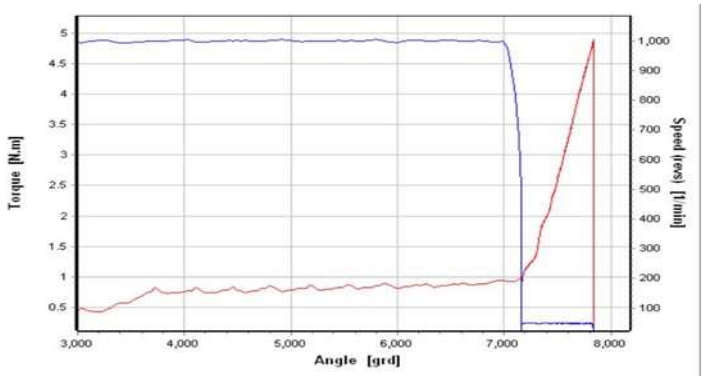
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	4,90	4,90	4,91	4,90	4,91	4,90	4,90	4,90	4,91	4,90
177718	3000015-05	367,00	363,00	362,00	363,00	369,00	363,00	360,00	363,00	367,00	368,00

Torque graphs

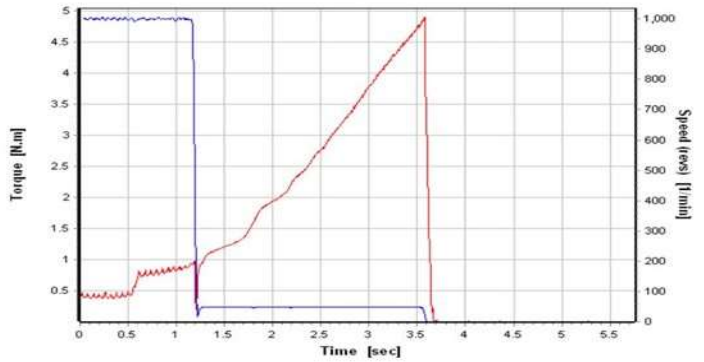
Machine Capability Study 100 %

Model: **CTBPW05Q**
Serial no: **GC0060**

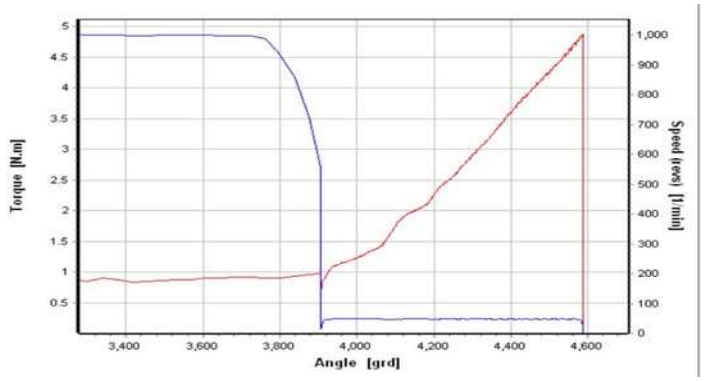
Angle degree: **360°**
Test torque: **4.9 Nm**



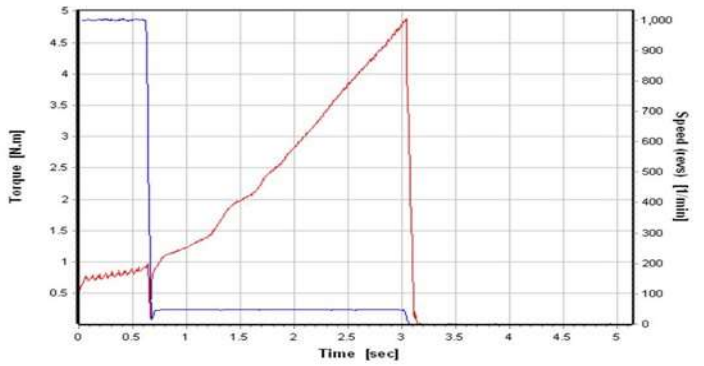
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Document no: 004/2021
Date: 8/3/2021

General Specifications

Manufacturer: Apex Tool Group **Tool type:** Cordless Assembly Tools

Model: CTBPW05Q **Serial no:** GC0060

Torque range: **1.1 Nm to 4.9 Nm**

Difference evaluation: Reference/Tool at 40° / 60 %

Capability examination

Snugfit value: 0.98 Nm **Torque tolerance ±** 7 %

Target torque: 2.94 Nm Tolerance: 5.00 % ± **2.50 %**

Angle degree: 40° Tolerance: 2.2° ± **1.1°**

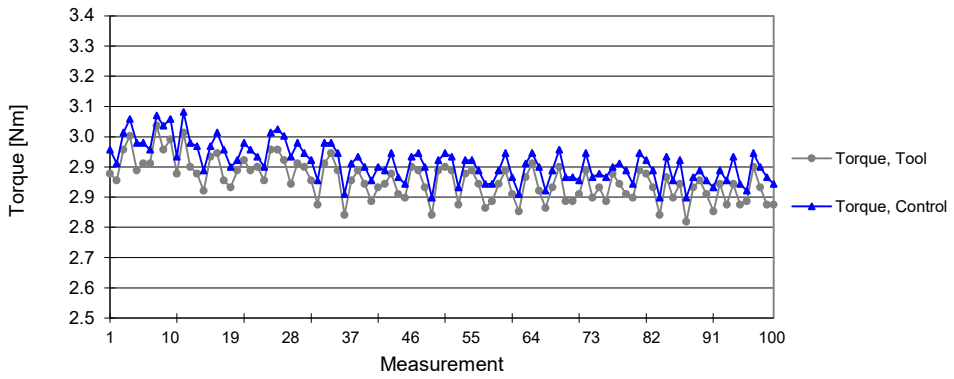
Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

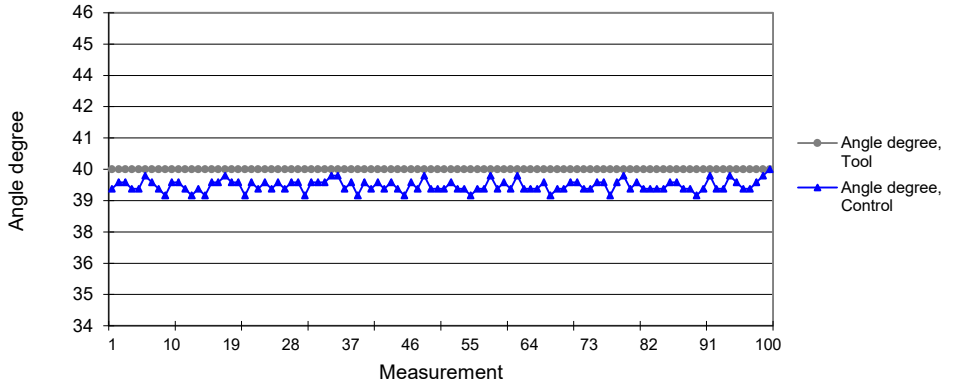
Tool without angle correction

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	2.92	40.00	2.99	39.25	0.07	0.75
2	2.90	40.00	2.95	39.50	0.05	0.50
3	2.99	40.00	3.04	39.50	0.05	0.50
4	3.03	40.00	3.08	39.25	0.05	0.75
5	2.93	40.00	3.01	39.25	0.08	0.75
6	2.95	40.00	3.01	39.75	0.06	0.25
7	2.95	40.00	2.99	39.50	0.04	0.50
8	3.06	40.00	3.09	39.25	0.03	0.75
9	2.99	40.00	3.06	39.00	0.07	1.00
10	3.02	40.00	3.08	39.50	0.06	0.50
11	2.92	40.00	2.97	39.50	0.05	0.50
12	3.04	40.00	3.10	39.25	0.06	0.75
13	2.94	40.00	3.01	39.00	0.07	1.00
14	2.92	40.00	3.00	39.25	0.08	0.75
15	2.87	40.00	2.93	39.00	0.06	1.00
16	2.97	40.00	3.00	39.50	0.03	0.50
17	2.98	40.00	3.04	39.50	0.06	0.50
18	2.90	40.00	2.99	39.75	0.09	0.25
19	2.88	40.00	2.94	39.50	0.06	0.50
20	2.93	40.00	2.96	39.50	0.03	0.50
21	2.96	40.00	3.01	39.00	0.05	1.00
22	2.93	40.00	2.99	39.50	0.06	0.50
23	2.94	40.00	2.97	39.25	0.03	0.75
24	2.90	40.00	2.94	39.50	0.04	0.50
25	2.99	40.00	3.04	39.25	0.05	0.75
26	2.99	40.00	3.05	39.50	0.06	0.50
27	2.96	40.00	3.03	39.25	0.07	0.75
28	2.89	40.00	2.97	39.50	0.08	0.50
29	2.95	40.00	3.01	39.50	0.06	0.50
30	2.94	40.00	2.98	39.00	0.04	1.00
31	2.90	40.00	2.96	39.50	0.06	0.50
32	2.83	40.00	2.90	39.50	0.07	0.50
33	2.95	40.00	3.01	39.50	0.06	0.50
34	2.98	40.00	3.01	39.75	0.03	0.25
35	2.93	40.00	2.98	39.75	0.05	0.25
36	2.80	40.00	2.86	39.25	0.06	0.75
37	2.90	40.00	2.95	39.50	0.05	0.50
38	2.93	40.00	2.97	39.00	0.04	1.00
39	2.89	40.00	2.94	39.50	0.05	0.50
40	2.84	40.00	2.90	39.25	0.06	0.75
41	2.88	40.00	2.94	39.50	0.06	0.50
42	2.89	40.00	2.93	39.25	0.04	0.75
43	2.92	40.00	2.98	39.50	0.06	0.50
44	2.86	40.00	2.91	39.25	0.05	0.75
45	2.85	40.00	2.89	39.00	0.04	1.00
46	2.94	40.00	2.97	39.50	0.03	0.50
47	2.93	40.00	2.98	39.25	0.05	0.75
48	2.88	40.00	2.94	39.75	0.06	0.25
49	2.80	40.00	2.85	39.25	0.05	0.75
50	2.93	40.00	2.96	39.25	0.03	0.75
51	2.94	40.00	2.98	39.25	0.04	0.75
52	2.93	40.00	2.97	39.50	0.04	0.50
53	2.83	40.00	2.88	39.25	0.05	0.75
54	2.92	40.00	2.96	39.25	0.04	0.75
55	2.93	40.00	2.96	39.00	0.03	1.00
56	2.89	40.00	2.93	39.25	0.04	0.75
57	2.82	40.00	2.89	39.25	0.07	0.75
58	2.84	40.00	2.89	39.75	0.05	0.25
59	2.89	40.00	2.93	39.25	0.04	0.75
60	2.93	40.00	2.98	39.50	0.05	0.50
61	2.86	40.00	2.91	39.25	0.05	0.75
62	2.81	40.00	2.86	39.75	0.05	0.25
63	2.91	40.00	2.95	39.25	0.04	0.75
64	2.95	40.00	2.98	39.25	0.03	0.75
65	2.87	40.00	2.94	39.25	0.07	0.75
66	2.82	40.00	2.87	39.50	0.05	0.50
67	2.88	40.00	2.93	39.00	0.05	1.00
68	2.94	40.00	2.99	39.25	0.05	0.75
69	2.84	40.00	2.91	39.25	0.07	0.75
70	2.84	40.00	2.91	39.50	0.07	0.50
71	2.86	40.00	2.90	39.50	0.04	0.50
72	2.93	40.00	2.98	39.25	0.05	0.75
73	2.85	40.00	2.91	39.25	0.06	0.75
74	2.88	40.00	2.92	39.50	0.04	0.50
75	2.84	40.00	2.91	39.50	0.07	0.50
76	2.92	40.00	2.94	39.00	0.02	1.00
77	2.89	40.00	2.95	39.50	0.06	0.50
78	2.86	40.00	2.93	39.75	0.07	0.25
79	2.85	40.00	2.89	39.25	0.04	0.75
80	2.93	40.00	2.98	39.50	0.05	0.50
81	2.92	40.00	2.96	39.25	0.04	0.75
82	2.88	40.00	2.93	39.25	0.05	0.75
83	2.80	40.00	2.85	39.25	0.05	0.75
84	2.91	40.00	2.97	39.25	0.06	0.75
85	2.85	40.00	2.90	39.50	0.05	0.50
86	2.89	40.00	2.96	39.50	0.07	0.50
87	2.78	40.00	2.85	39.25	0.07	0.75
88	2.88	40.00	2.91	39.25	0.03	0.75
89	2.90	40.00	2.93	39.00	0.03	1.00
90	2.86	40.00	2.90	39.25	0.04	0.75
91	2.81	40.00	2.88	39.75	0.07	0.25
92	2.89	40.00	2.93	39.25	0.04	0.75
93	2.83	40.00	2.90	39.25	0.07	0.75
94	2.89	40.00	2.97	39.75	0.08	0.25
95	2.83	40.00	2.89	39.50	0.06	0.50
96	2.84	40.00	2.87	39.25	0.03	0.75
97	2.94	40.00	2.98	39.25	0.04	0.75
98	2.88	40.00	2.94	39.50	0.06	0.50
99	2.83	40.00	2.91	39.75	0.08	0.25
100	2.83	40.00	2.89	40.00	0.06	0.00
				Standard deviation:	**0.015**	**0.218**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool without angle correction	





Machine Capability Study
Control System

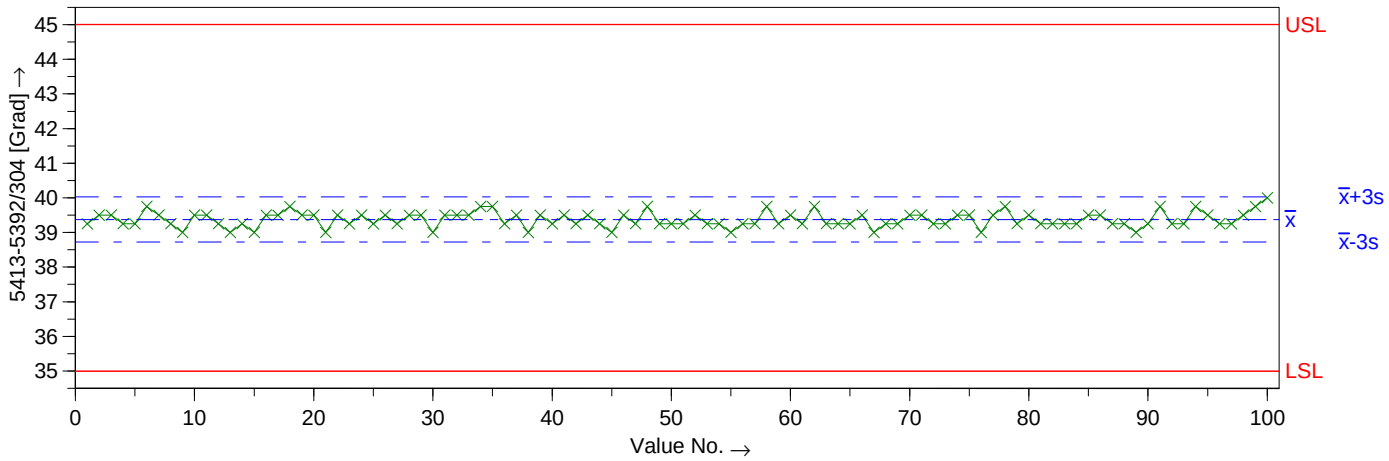
Cleco Production Tools

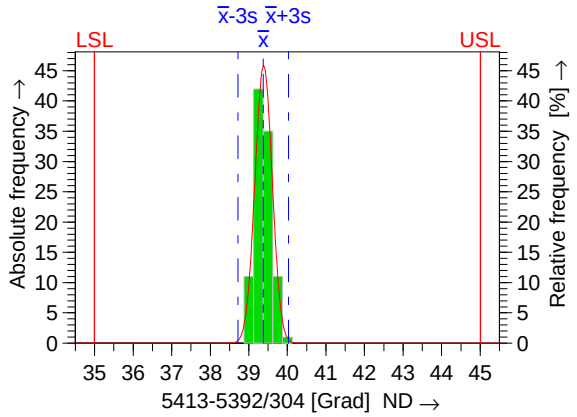
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	08.07.2021		

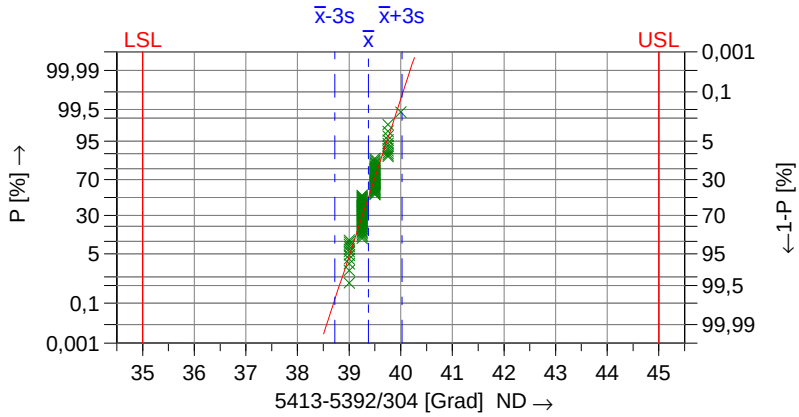
Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0060k	Char.Descr.	5413-5392/304	Inspection Val. 40,00 5,00	USL 45,00
		Serial No.	5376169	Unit Grad -5,00	LSL 35,00
Char.Type	variable			Tolerance value 12 %	Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100

Evaluation from 08.07.2021 02:07:32 to 08.07.2021 02:54:28

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM







Drawing Values		Collected Values		Statistics	
T_m	40.00			$\bar{x}$	39.3725
LSL	35.00	x_{min}	39.00	$\bar{x}$-3s	38.7198
USL	45.00	x_{max}	40.00	$\bar{x}$+3s	40.0252
T	10.00	R	1.00	6s	1.3055
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	7.66
Critical capability index	=	C_{mk}	6.70

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 08.07.2021

Ser.No.	GC0060k	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,94
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,22
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	2,99	2,95	3,04	3,08	3,01	3,01	2,99	3,09	3,06	3,08
5376169	5413-5392/304	39,25	39,50	39,50	39,25	39,25	39,75	39,50	39,25	39,00	39,50

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	2,97	3,10	3,01	3,00	2,93	3,00	3,04	2,99	2,94	2,96
5376169	5413-5392/304	39,50	39,25	39,00	39,25	39,00	39,50	39,50	39,75	39,50	39,50

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	3,01	2,99	2,97	2,94	3,04	3,05	3,03	2,97	3,01	2,98
5376169	5413-5392/304	39,00	39,50	39,25	39,50	39,25	39,50	39,25	39,50	39,50	39,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	2,96	2,90	3,01	3,01	2,98	2,86	2,95	2,97	2,94	2,90
5376169	5413-5392/304	39,50	39,50	39,50	39,75	39,75	39,25	39,50	39,00	39,50	39,25

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	2,94	2,93	2,98	2,91	2,89	2,97	2,98	2,94	2,85	2,96
5376169	5413-5392/304	39,50	39,25	39,50	39,25	39,00	39,50	39,25	39,75	39,25	39,25

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	2,98	2,97	2,88	2,96	2,96	2,93	2,89	2,89	2,93	2,98
5376169	5413-5392/304	39,25	39,50	39,25	39,25	39,00	39,25	39,25	39,75	39,25	39,50

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	2,91	2,86	2,95	2,98	2,94	2,87	2,93	2,99	2,91	2,91
5376169	5413-5392/304	39,25	39,75	39,25	39,25	39,25	39,50	39,00	39,25	39,25	39,50

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	2,90	2,98	2,91	2,92	2,91	2,94	2,95	2,93	2,89	2,98
5376169	5413-5392/304	39,50	39,25	39,25	39,50	39,50	39,00	39,50	39,75	39,25	39,50

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 08.07.2021

Ser.No.	GC0060k	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,94
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,22
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	2,96	2,93	2,85	2,97	2,90	2,96	2,85	2,91	2,93	2,90
5376169	5413-5392/304	39,25	39,25	39,25	39,25	39,50	39,50	39,25	39,25	39,00	39,25

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	2,88	2,93	2,90	2,97	2,89	2,87	2,98	2,94	2,91	2,89
5376169	5413-5392/304	39,75	39,25	39,25	39,75	39,50	39,25	39,25	39,50	39,75	40,00

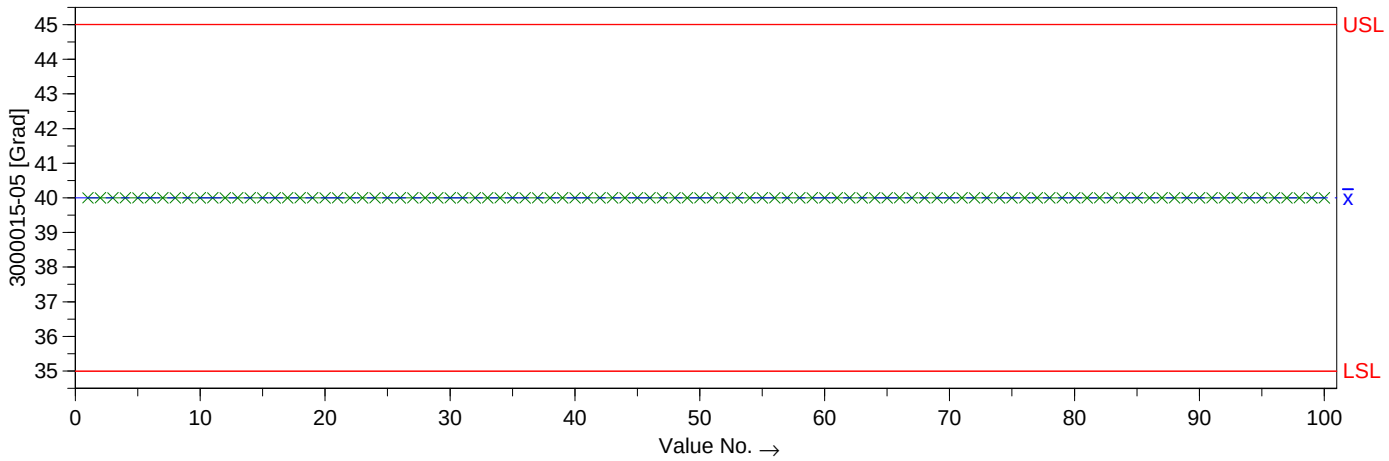
Machine Capability Study
Tool System

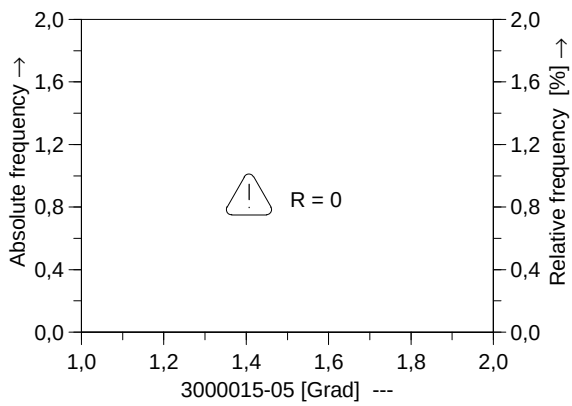
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	08.07.2021		

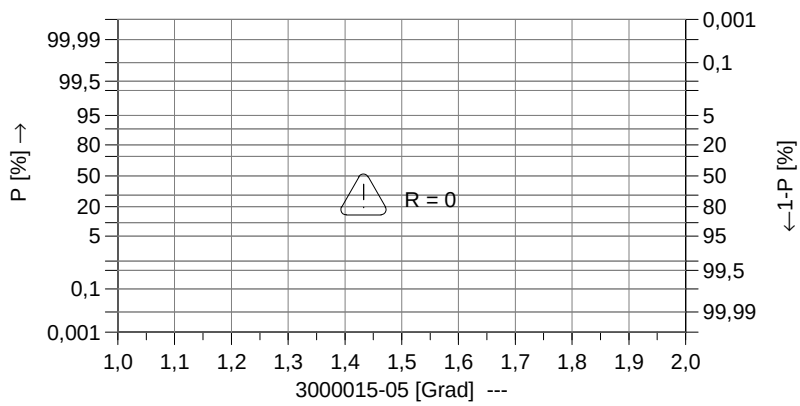
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060k	Char.Descr.	3000015-05	Inspection Val.	40,00 5,00	USL	45,00
		Serial No.	177718	Unit	Grad -5,00	LSL	35,00
Char.Type	variable			Tolerance value	12 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 08.07.2021 14:07:30 to 08.07.2021 14:54:27

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM







Drawing Values		Collected Values		Statistics	
T_m	40.00			$\bar{x}$	40.0000
LSL	35.00	x_{min}	40.00		
USL	45.00	x_{max}	40.00		
T	10.00	R	0.00		
		$n_{<T>}$	100		
		$n_{>USL}$	0		
		$n_{<LSL}$	0		
		n_{eff}	100		
		n_{tot}	100		

--- R = 0 ---

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 08.07.2021

Ser.No.	GC0060k	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,53
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	3,67
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	2,92	2,90	2,99	3,03	2,93	2,95	2,95	3,06	2,99	3,02
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	2,92	3,04	2,94	2,92	2,87	2,97	2,98	2,90	2,88	2,93
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	2,96	2,93	2,94	2,90	2,99	2,99	2,96	2,89	2,95	2,94
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	2,90	2,83	2,95	2,98	2,93	2,80	2,90	2,93	2,89	2,84
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	2,88	2,89	2,92	2,86	2,85	2,94	2,93	2,88	2,80	2,93
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	2,94	2,93	2,83	2,92	2,93	2,89	2,82	2,84	2,89	2,93
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	2,86	2,81	2,91	2,95	2,87	2,82	2,88	2,94	2,84	2,84
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	2,86	2,93	2,85	2,88	2,84	2,92	2,89	2,86	2,85	2,93
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 08.07.2021

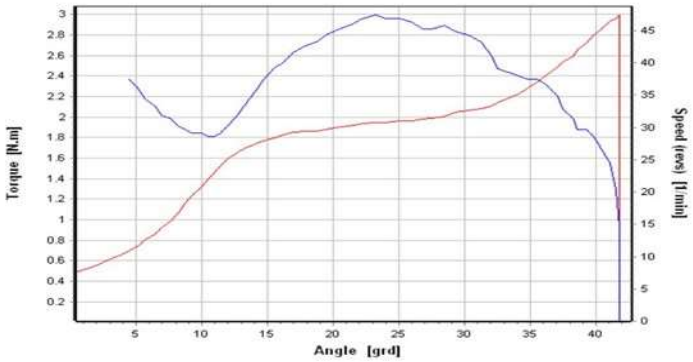
Ser.No.	GC0060k	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,53
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	3,67
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	2,92	2,88	2,80	2,91	2,85	2,89	2,78	2,88	2,90	2,86
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

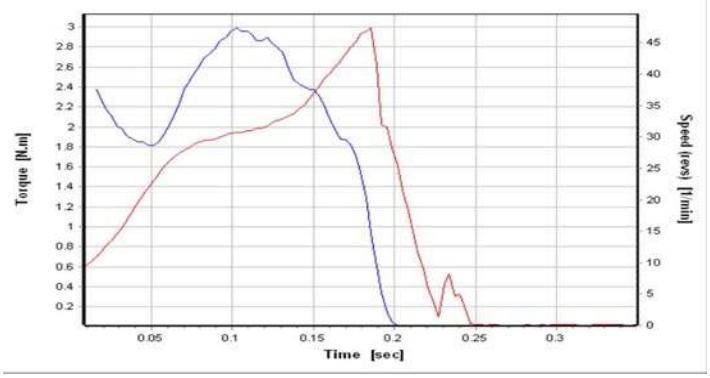
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	2,81	2,89	2,83	2,89	2,83	2,84	2,94	2,88	2,83	2,83
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Torque graphs

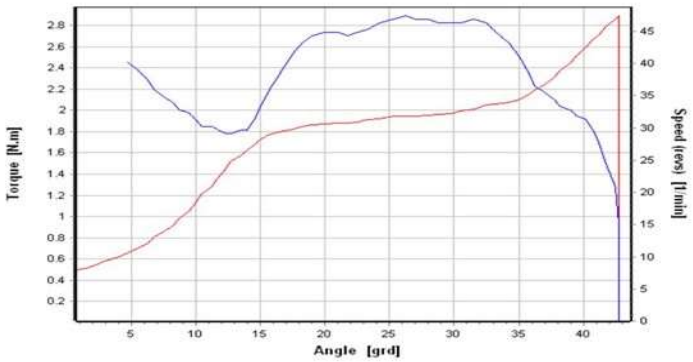
Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool without angle correction	



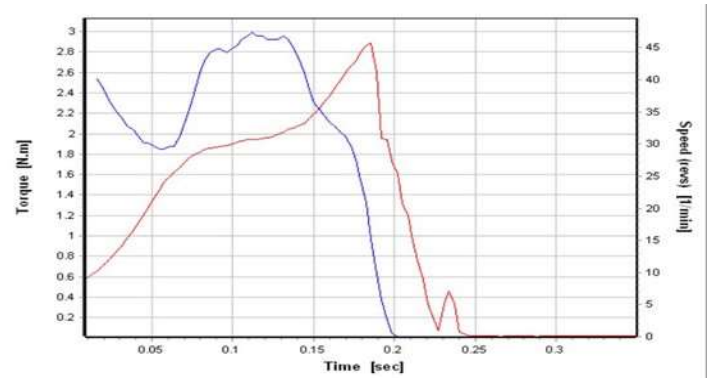
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

General Specifications

Manufacturer: Apex Tool Group **Tool type:** Cordless Assembly Tools

Model: CTBPW05Q **Serial no:** GC0060

Torque range: **1.1 Nm to 4.9 Nm**

Difference evaluation: Reference/Tool at 40° / 60 %

Capability examination

Snugfit value: 0.98 Nm **Torque tolerance ±** 7 %

Target torque: 2.94 Nm Tolerance: 5.84 % ± **2.92 %**

Angle degree: 40° Tolerance: 5.6° ± **2.8°**

Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

Tool with angle correction

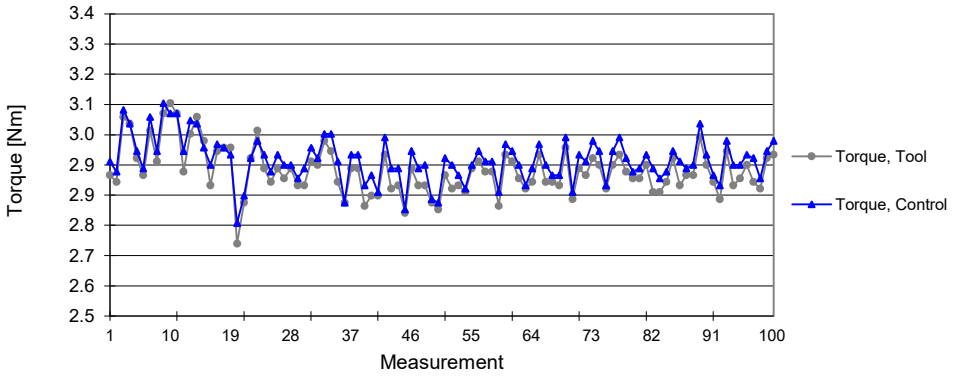
For measurements, the screwdriver must be held by hand and alternately moved.
In the column "Move +", the angle range in the screw direction,
In the column "Move -" of the direction opposite the direction of tightening,
within this range, the tool has to be moved.
Pay attention to changing angle values and directions of movement.
The indicated maximum values for "Move +" and "Move -"
have per measurement series minimum 5 times.

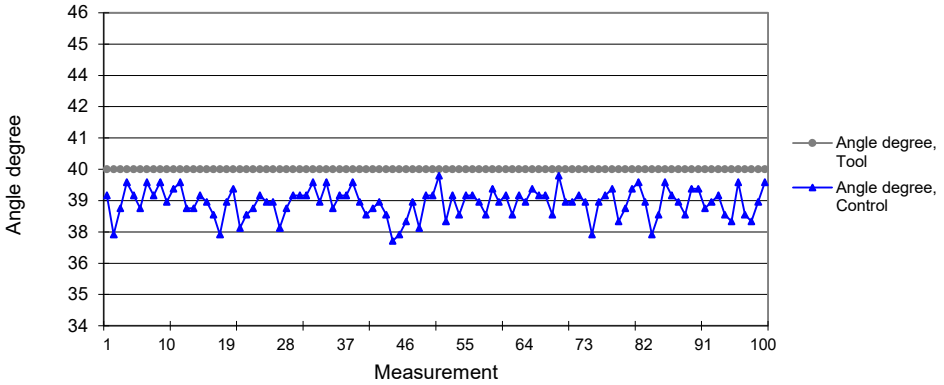
Move		Test conditions
+	-	0
0-25°	0-45°	Tool hand held

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	2.91	40.00	2.95	39.00	0.04	1.00
2	2.89	40.00	2.92	37.50	0.03	2.50
3	3.08	40.00	3.10	38.50	0.02	1.50
4	3.06	40.00	3.06	39.50	0.00	0.50
5	2.96	40.00	2.98	39.00	0.02	1.00
6	2.91	40.00	2.93	38.50	0.02	1.50
7	3.04	40.00	3.08	39.50	0.04	0.50
8	2.95	40.00	2.98	39.00	0.03	1.00
9	3.09	40.00	3.12	39.50	0.03	0.50
10	3.12	40.00	3.09	38.75	0.03	1.25
11	3.09	40.00	3.09	39.25	0.00	0.75
12	2.92	40.00	2.98	39.50	0.06	0.50
13	3.03	40.00	3.07	38.50	0.04	1.50
14	3.08	40.00	3.06	38.50	0.02	1.50
15	3.01	40.00	2.99	39.00	0.02	1.00
16	2.88	40.00	2.94	38.75	0.06	1.25
17	2.98	40.00	3.00	38.25	0.02	1.75
18	2.99	40.00	2.99	37.50	0.00	2.50
19	2.99	40.00	2.97	38.75	0.02	1.25
20	2.71	40.00	2.77	39.25	0.06	0.75
21	2.83	40.00	2.85	37.75	0.02	2.25
22	2.96	40.00	2.96	38.25	0.00	1.75
23	3.04	40.00	3.01	38.50	0.03	1.50
24	2.93	40.00	2.97	39.00	0.04	1.00
25	2.89	40.00	2.92	38.75	0.03	1.25
26	2.93	40.00	2.97	38.75	0.04	1.25
27	2.90	40.00	2.94	37.75	0.04	2.25
28	2.93	40.00	2.94	38.50	0.01	1.50
29	2.88	40.00	2.90	39.00	0.02	1.00
30	2.88	40.00	2.93	39.00	0.05	1.00
31	2.95	40.00	2.99	39.00	0.04	1.00
32	2.94	40.00	2.96	39.50	0.02	0.50
33	3.01	40.00	3.03	38.75	0.02	1.25
34	2.98	40.00	3.03	39.50	0.05	0.50
35	2.89	40.00	2.95	38.50	0.06	1.50
36	2.83	40.00	2.83	39.00	0.00	1.00
37	2.93	40.00	2.97	39.00	0.04	1.00
38	2.93	40.00	2.97	39.50	0.04	0.50
39	2.82	40.00	2.88	38.75	0.06	1.25
40	2.85	40.00	2.91	38.25	0.06	1.75
41	2.85	40.00	2.86	38.50	0.01	1.50
42	2.97	40.00	3.02	38.75	0.05	1.25
43	2.87	40.00	2.93	38.25	0.06	1.75
44	2.88	40.00	2.93	37.25	0.05	2.75
45	2.80	40.00	2.81	37.50	0.01	2.50
46	2.93	40.00	2.98	38.00	0.05	2.00
47	2.88	40.00	2.93	38.75	0.05	1.25
48	2.88	40.00	2.94	37.75	0.06	2.25
49	2.83	40.00	2.84	39.00	0.01	1.00
50	2.81	40.00	2.83	39.00	0.02	1.00
51	2.91	40.00	2.96	39.75	0.05	0.25
52	2.87	40.00	2.94	38.00	0.07	2.00
53	2.88	40.00	2.91	39.00	0.03	1.00
54	2.86	40.00	2.87	38.25	0.01	1.75
55	2.93	40.00	2.94	39.00	0.01	1.00
56	2.95	40.00	2.98	39.00	0.03	1.00
57	2.92	40.00	2.95	38.75	0.03	1.25
58	2.92	40.00	2.95	38.25	0.03	1.75
59	2.82	40.00	2.86	39.25	0.04	0.75
60	2.97	40.00	3.00	38.75	0.03	1.25
61	2.95	40.00	2.98	39.00	0.03	1.00
62	2.90	40.00	2.94	38.25	0.04	1.75
63	2.87	40.00	2.88	39.00	0.01	1.00
64	2.89	40.00	2.93	38.75	0.04	1.25
65	2.97	40.00	3.00	39.25	0.03	0.75
66	2.89	40.00	2.94	39.00	0.05	1.00
67	2.89	40.00	2.91	39.00	0.02	1.00
68	2.88	40.00	2.91	38.25	0.03	1.75
69	2.99	40.00	3.02	39.75	0.03	0.25
70	2.84	40.00	2.86	38.75	0.02	1.25
71	2.93	40.00	2.97	38.75	0.04	1.25
72	2.91	40.00	2.95	39.00	0.04	1.00
73	2.96	40.00	3.01	38.75	0.05	1.25
74	2.94	40.00	2.98	37.50	0.04	2.50
75	2.87	40.00	2.88	38.75	0.01	1.25
76	2.94	40.00	2.98	39.00	0.04	1.00
77	2.97	40.00	3.02	39.25	0.05	0.75
78	2.92	40.00	2.96	38.00	0.04	2.00
79	2.90	40.00	2.92	38.50	0.02	1.50
80	2.90	40.00	2.93	39.25	0.03	0.75
81	2.94	40.00	2.97	39.50	0.03	0.50
82	2.86	40.00	2.93	38.75	0.07	1.25
83	2.86	40.00	2.90	37.50	0.04	2.50
84	2.89	40.00	2.92	38.25	0.03	1.75
85	2.96	40.00	2.98	39.50	0.02	0.50
86	2.88	40.00	2.95	39.00	0.07	1.00
87	2.91	40.00	2.93	38.75	0.02	1.25
88	2.91	40.00	2.94	38.25	0.03	1.75
89	3.02	40.00	3.06	39.25	0.04	0.75
90	2.94	40.00	2.97	39.25	0.03	0.75
91	2.89	40.00	2.91	38.50	0.02	1.50
92	2.84	40.00	2.88	38.75	0.04	1.25
93	2.98	40.00	3.01	39.00	0.03	1.00
94	2.88	40.00	2.94	38.25	0.06	1.75
95	2.90	40.00	2.94	38.00	0.04	2.00
96	2.94	40.00	2.97	39.50	0.03	0.50
97	2.89	40.00	2.96	38.25	0.07	1.75
98	2.87	40.00	2.90	38.00	0.03	2.00
99	2.96	40.00	2.98	38.75	0.02	1.25
100	2.97	40.00	3.01	39.50	0.04	0.50
				Standard deviation:	**0.017**	**0.560**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool with angle correction	





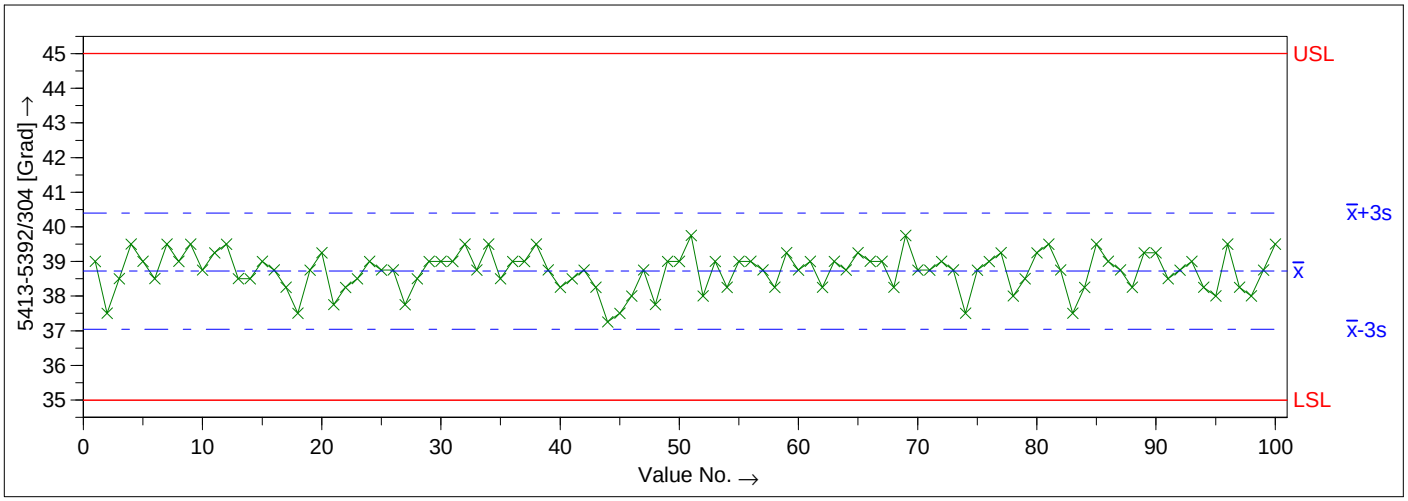
Machine Capability Study
Control System

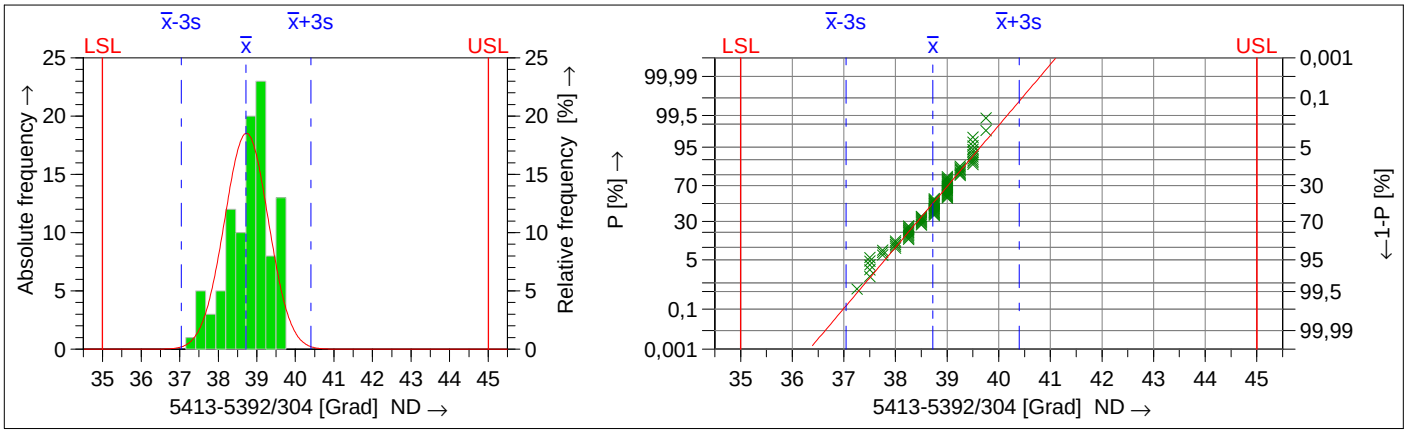
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	03.08.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060m	Char.Descr.	5413-5392/304	Inspection Val.	40,00	5,00	USL 45,00
		Serial No.	5376169	Unit	Grad	-5,00	LSL 35,00
Char.Type	variable			Tolerance value	12 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 03.08.2021 01:13:33 to 03.08.2021 01:38:25

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope





Drawing Values		Collected Values		Statistics	
T_m	40.00			x̄	38.7200
LSL	35.00	x_{min}	37.25	x̄-3s	37.0403
USL	45.00	x_{max}	39.75	x̄+3s	40.3997
T	10.00	R	2.50	6s	3.3594
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			M1 1.4 $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	2.98
Critical capability index	=	C_{mk}	2.21

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060m	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,91
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,17
				USL	3,74
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	2,95	2,92	3,10	3,06	2,98	2,93	3,08	2,98	3,12	3,09
5376169	5413-5392/304	39,00	37,50	38,50	39,50	39,00	38,50	39,50	39,00	39,50	38,75

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	3,09	2,98	3,07	3,06	2,99	2,94	3,00	2,99	2,97	2,77
5376169	5413-5392/304	39,25	39,50	38,50	38,50	39,00	38,75	38,25	37,50	38,75	39,25

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	2,85	2,96	3,01	2,97	2,92	2,97	2,94	2,94	2,90	2,93
5376169	5413-5392/304	37,75	38,25	38,50	39,00	38,75	38,75	37,75	38,50	39,00	39,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	2,99	2,96	3,03	3,03	2,95	2,83	2,97	2,97	2,88	2,91
5376169	5413-5392/304	39,00	39,50	38,75	39,50	38,50	39,00	39,00	39,50	38,75	38,25

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	2,86	3,02	2,93	2,93	2,81	2,98	2,93	2,94	2,84	2,83
5376169	5413-5392/304	38,50	38,75	38,25	37,25	37,50	38,00	38,75	37,75	39,00	39,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	2,96	2,94	2,91	2,87	2,94	2,98	2,95	2,95	2,86	3,00
5376169	5413-5392/304	39,75	38,00	39,00	38,25	39,00	39,00	38,75	38,25	39,25	38,75

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	2,98	2,94	2,88	2,93	3,00	2,94	2,91	2,91	3,02	2,86
5376169	5413-5392/304	39,00	38,25	39,00	38,75	39,25	39,00	39,00	38,25	39,75	38,75

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	2,97	2,95	3,01	2,98	2,88	2,98	3,02	2,96	2,92	2,93
5376169	5413-5392/304	38,75	39,00	38,75	37,50	38,75	39,00	39,25	38,00	38,50	39,25

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060m	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,91
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,17
				USL	3,74
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	2,97	2,93	2,90	2,92	2,98	2,95	2,93	2,94	3,06	2,97
5376169	5413-5392/304	39,50	38,75	37,50	38,25	39,50	39,00	38,75	38,25	39,25	39,25

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	2,91	2,88	3,01	2,94	2,94	2,97	2,96	2,90	2,98	3,01
5376169	5413-5392/304	38,50	38,75	39,00	38,25	38,00	39,50	38,25	38,00	38,75	39,50

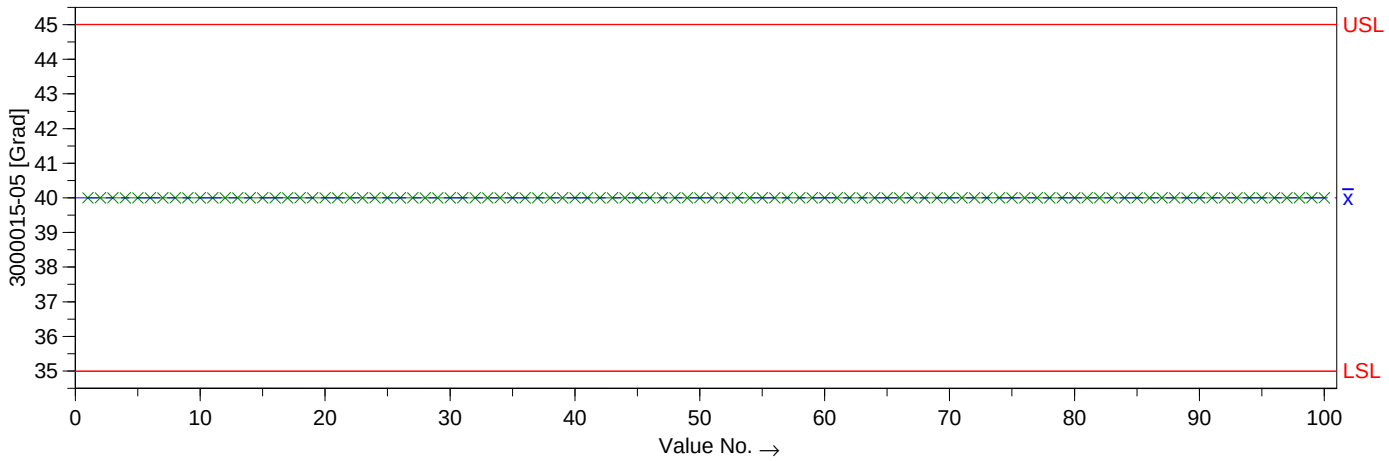
Machine Capability Study
Tool System

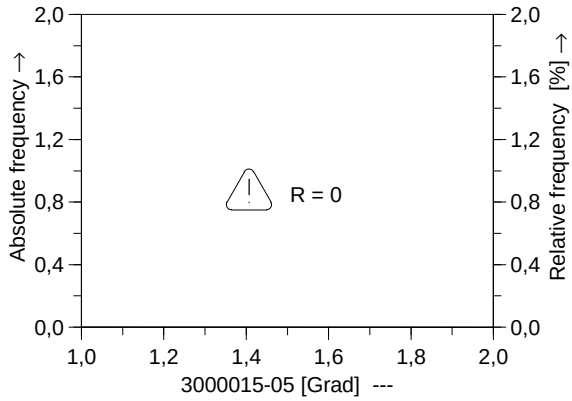
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	03.08.2021		

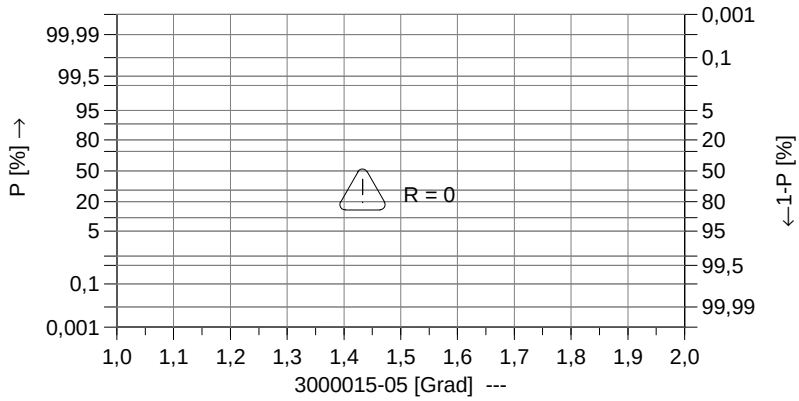
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060m	Char.Descr.	3000015-05	Inspection Val.	40,00	5,00	USL 45,00
		Serial No.	177718	Unit	Grad	-5,00	LSL 35,00
Char.Type	variable			Tolerance value	12 %		Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 03.08.2021 13:13:31 to 03.08.2021 13:38:23

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope







Drawing Values		Collected Values		Statistics	
T_m	40.00			$\bar{x}$	40.0000
LSL	35.00	x_{min}	40.00		
USL	45.00	x_{max}	40.00		
T	10.00	R	0.00		
		$n_{<T>}$	100		
		$n_{>USL}$	0		
		$n_{<LSL}$	0		
		n_{eff}	100		
		n_{tot}	100		

--- R = 0 ---

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060m	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,56
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	3,74
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	2,91	2,89	3,08	3,06	2,96	2,91	3,04	2,95	3,09	3,12
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	3,09	2,92	3,03	3,08	3,01	2,88	2,98	2,99	2,99	2,71
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	2,83	2,96	3,04	2,93	2,89	2,93	2,90	2,93	2,88	2,88
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	2,95	2,94	3,01	2,98	2,89	2,83	2,93	2,93	2,82	2,85
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	2,85	2,97	2,87	2,88	2,80	2,93	2,88	2,88	2,83	2,81
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	2,91	2,87	2,88	2,86	2,93	2,95	2,92	2,92	2,82	2,97
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	2,95	2,90	2,87	2,89	2,97	2,89	2,89	2,88	2,99	2,84
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	2,93	2,91	2,96	2,94	2,87	2,94	2,97	2,92	2,90	2,90
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

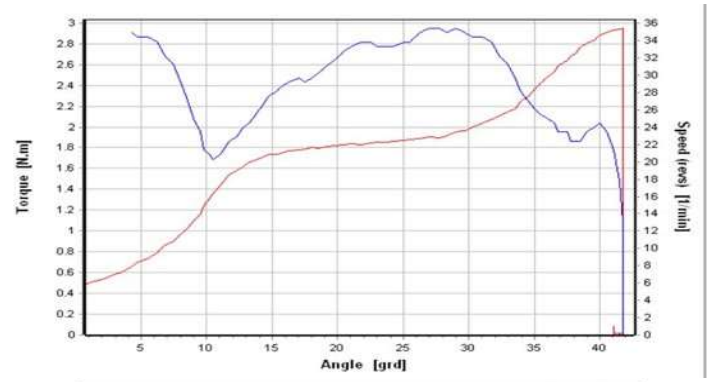
Ser.No.	GC0060m	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,56
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	3,74
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.85 Nm; Cur- Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	2,94	2,86	2,86	2,89	2,96	2,88	2,91	2,91	3,02	2,94
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

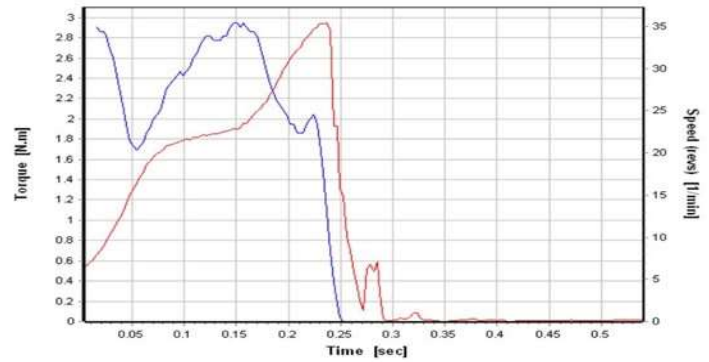
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	2,89	2,84	2,98	2,88	2,90	2,94	2,89	2,87	2,96	2,97
177718	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Torque graphs

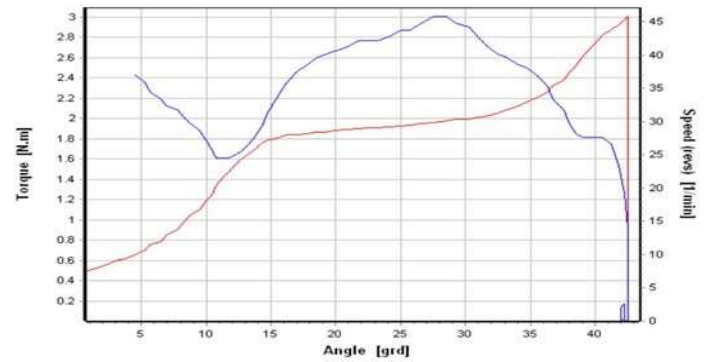
Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool with angle correction	



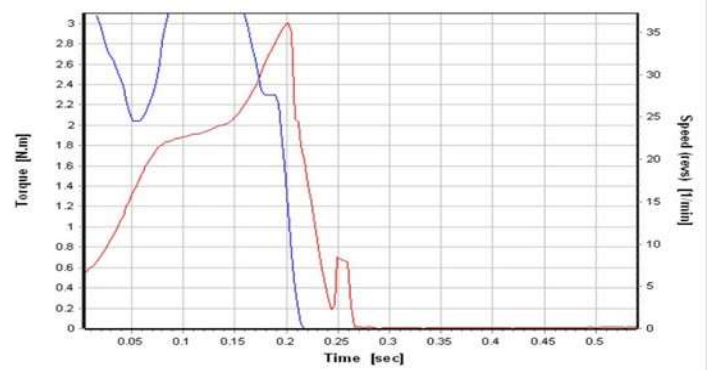
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

General Specifications

Manufacturer: Apex Tool Group **Tool type:** Cordless Assembly Tools

Model: CTBPW05Q **Serial no:** GC0060

Torque range: **1.1 Nm to 4.9 Nm**

Difference evaluation: Reference/Tool at 180 ° / 80%

Capability examination

Snugfit value: 0.98 Nm **Torque tolerance ±** 7 %

Target torque: 3.92 Nm Tolerance: 4.30 % ± **2.15 %**

Angle degree: 180° Tolerance: 4.1° ± **2.0°**

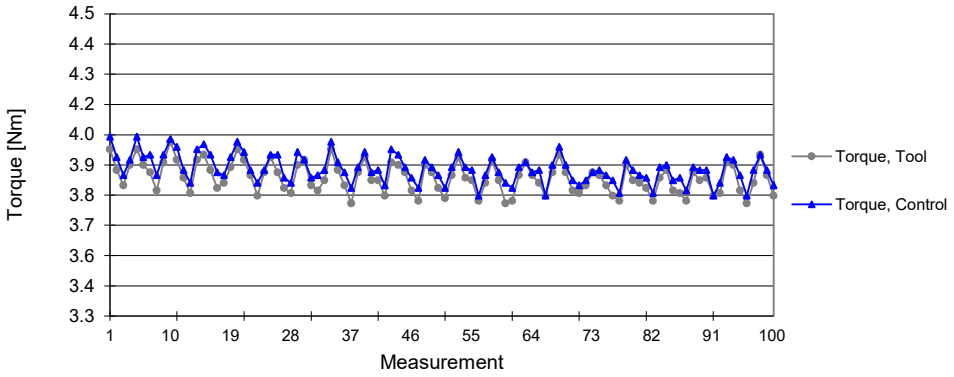
Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

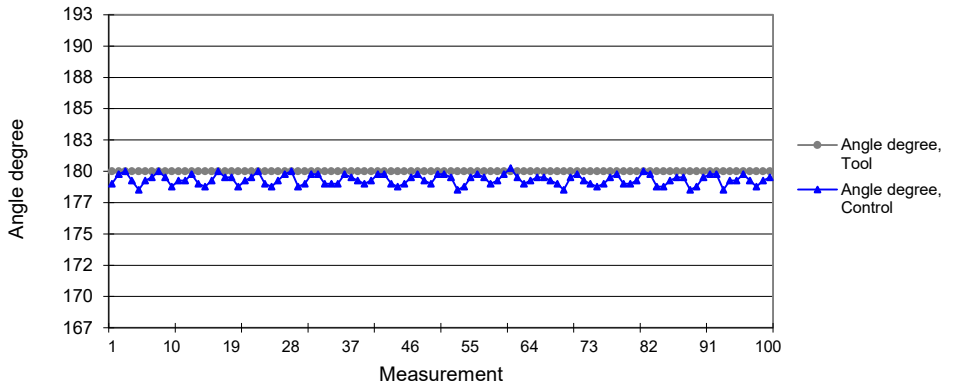
Tool without angle correction

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	3.98	180.00	4.03	179.00	0.05	1.00
2	3.90	180.00	3.95	179.75	0.05	0.25
3	3.84	180.00	3.88	180.00	0.04	0.00
4	3.92	180.00	3.94	179.25	0.02	0.75
5	3.98	180.00	4.03	178.50	0.05	1.50
6	3.92	180.00	3.95	179.25	0.03	0.75
7	3.89	180.00	3.96	179.50	0.07	0.50
8	3.82	180.00	3.88	180.00	0.06	0.00
9	3.93	180.00	3.96	179.50	0.03	0.50
10	4.01	180.00	4.02	178.75	0.01	1.25
11	3.94	180.00	3.99	179.25	0.05	0.75
12	3.87	180.00	3.90	179.25	0.03	0.75
13	3.81	180.00	3.85	179.75	0.04	0.25
14	3.94	180.00	3.98	179.00	0.04	1.00
15	3.96	180.00	4.00	178.75	0.04	1.25
16	3.90	180.00	3.96	179.25	0.06	0.75
17	3.83	180.00	3.89	180.00	0.06	0.00
18	3.85	180.00	3.88	179.50	0.03	0.50
19	3.91	180.00	3.95	179.50	0.04	0.50
20	3.98	180.00	4.01	178.75	0.03	1.25
21	3.94	180.00	3.97	179.25	0.03	0.75
22	3.88	180.00	3.90	179.50	0.02	0.50
23	3.80	180.00	3.85	180.00	0.05	0.00
24	3.89	180.00	3.90	179.00	0.01	1.00
25	3.95	180.00	3.96	178.75	0.01	1.25
26	3.89	180.00	3.96	179.25	0.07	0.75
27	3.83	180.00	3.87	179.75	0.04	0.25
28	3.81	180.00	3.85	180.00	0.04	0.00
29	3.92	180.00	3.97	178.75	0.05	1.25
30	3.94	180.00	3.94	179.00	0.00	1.00
31	3.84	180.00	3.87	179.75	0.03	0.25
32	3.82	180.00	3.88	179.75	0.06	0.25
33	3.86	180.00	3.90	179.00	0.04	1.00
34	3.98	180.00	4.01	179.00	0.03	1.00
35	3.90	180.00	3.93	179.00	0.03	1.00
36	3.84	180.00	3.89	179.75	0.05	0.25
37	3.77	180.00	3.83	179.50	0.06	0.50
38	3.89	180.00	3.91	179.25	0.02	0.75
39	3.95	180.00	3.97	179.00	0.02	1.00
40	3.86	180.00	3.89	179.25	0.03	0.75
41	3.86	180.00	3.90	179.75	0.04	0.25
42	3.80	180.00	3.84	179.75	0.04	0.25
43	3.93	180.00	3.98	179.00	0.05	1.00
44	3.92	180.00	3.96	178.75	0.04	1.25
45	3.89	180.00	3.91	179.00	0.02	1.00
46	3.82	180.00	3.87	179.50	0.05	0.50
47	3.78	180.00	3.83	179.75	0.05	0.25
48	3.92	180.00	3.94	179.25	0.02	0.75
49	3.89	180.00	3.91	179.00	0.02	1.00
50	3.83	180.00	3.88	179.75	0.05	0.25
51	3.79	180.00	3.83	179.75	0.04	0.25
52	3.88	180.00	3.91	179.50	0.03	0.50
53	3.95	180.00	3.97	178.50	0.02	1.50
54	3.87	180.00	3.91	178.75	0.04	1.25
55	3.86	180.00	3.90	179.50	0.04	0.50
56	3.78	180.00	3.80	179.75	0.02	0.25
57	3.85	180.00	3.88	179.50	0.03	0.50
58	3.94	180.00	3.95	179.00	0.01	1.00
59	3.86	180.00	3.89	179.25	0.03	0.75
60	3.77	180.00	3.85	179.75	0.08	0.25
61	3.78	180.00	3.83	180.25	0.05	0.25
62	3.88	180.00	3.91	179.50	0.03	0.50
63	3.93	180.00	3.93	179.00	0.00	1.00
64	3.88	180.00	3.89	179.25	0.01	0.75
65	3.85	180.00	3.90	179.50	0.05	0.50
66	3.80	180.00	3.80	179.50	0.00	0.50
67	3.89	180.00	3.92	179.25	0.03	0.75
68	3.96	180.00	3.99	179.00	0.03	1.00
69	3.89	180.00	3.92	178.50	0.03	1.50
70	3.82	180.00	3.86	179.50	0.04	0.50
71	3.81	180.00	3.84	179.75	0.03	0.25
72	3.84	180.00	3.86	179.25	0.02	0.75
73	3.89	180.00	3.89	179.00	0.00	1.00
74	3.88	180.00	3.90	178.75	0.02	1.25
75	3.84	180.00	3.88	179.00	0.04	1.00
76	3.80	180.00	3.86	179.50	0.06	0.50
77	3.78	180.00	3.81	179.75	0.03	0.25
78	3.92	180.00	3.94	179.00	0.02	1.00
79	3.86	180.00	3.90	179.00	0.04	1.00
80	3.85	180.00	3.88	179.25	0.03	0.75
81	3.83	180.00	3.87	180.00	0.04	0.00
82	3.78	180.00	3.81	179.75	0.03	0.25
83	3.87	180.00	3.91	178.75	0.04	1.25
84	3.90	180.00	3.92	178.75	0.02	1.25
85	3.82	180.00	3.86	179.25	0.04	0.75
86	3.81	180.00	3.87	179.50	0.06	0.50
87	3.78	180.00	3.82	179.50	0.04	0.50
88	3.89	180.00	3.91	178.50	0.02	1.50
89	3.86	180.00	3.90	178.75	0.04	1.25
90	3.87	180.00	3.90	179.50	0.03	0.50
91	3.80	180.00	3.80	179.75	0.00	0.25
92	3.81	180.00	3.85	179.75	0.04	0.25
93	3.93	180.00	3.95	178.50	0.02	1.50
94	3.92	180.00	3.94	179.25	0.02	0.75
95	3.82	180.00	3.88	179.25	0.06	0.75
96	3.77	180.00	3.80	179.75	0.03	0.25
97	3.85	180.00	3.90	179.25	0.05	0.75
98	3.96	180.00	3.96	178.75	0.00	1.25
99	3.88	180.00	3.90	179.25	0.02	0.75
100	3.80	180.00	3.84	179.50	0.04	0.50
				Standard deviation:	**0.017**	**0.405**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool without angle correction	





Machine Capability Study
Control System

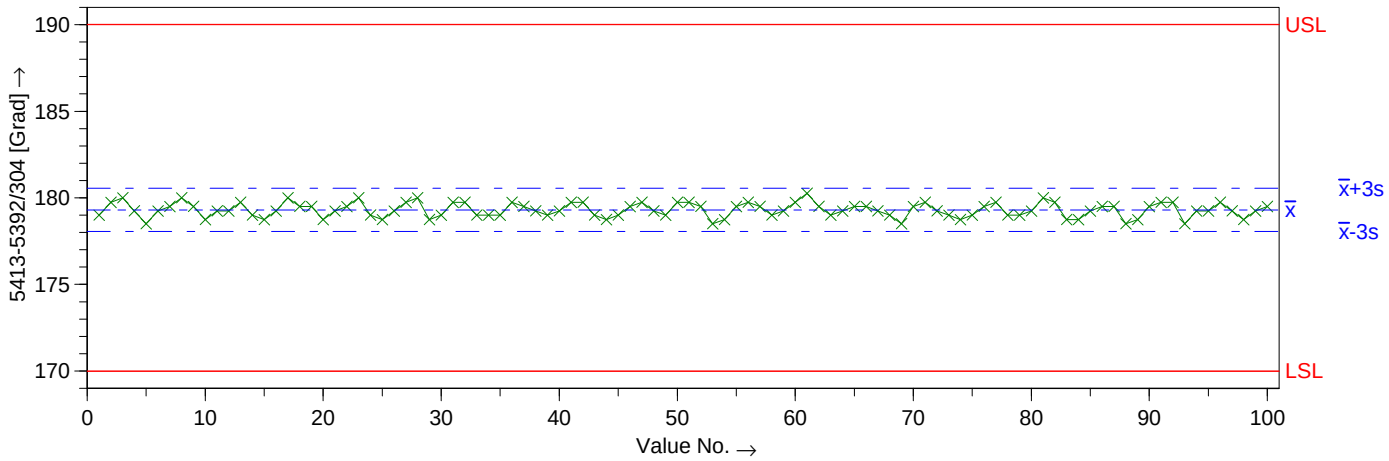
Page 1 / 1

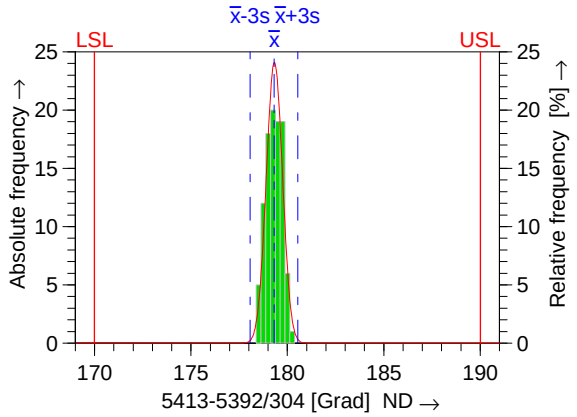
Plant ATG Lexington		Operator Name M. SHERMAN	Date 09.07.2021

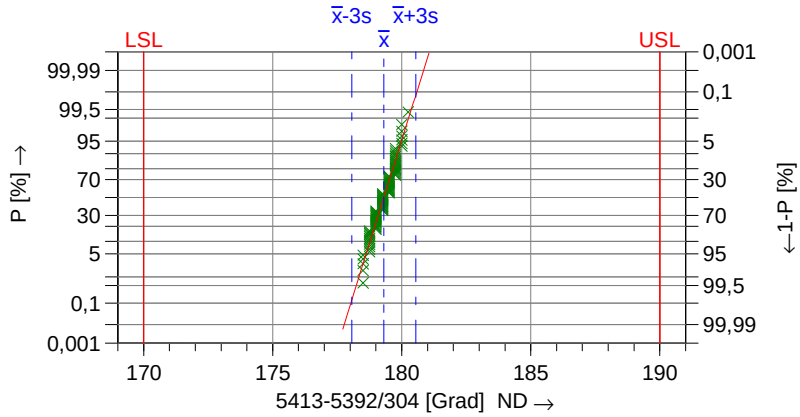
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060l	Char.Descr. 5413-5392/304	Inspection Val.	180,00	10,00	USL 190,00
	Serial No. 5376169	Unit	Grad	-10,00	LSL 170,00
Char.Type variable		Tolerance value	6 %		Decimal Pl. 2
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 09.07.2021 01:21:41 to 09.07.2021 01:51:22

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM







Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	179.3050
LSL	170.00	x_{min}	178.50	$\bar{x}$-3s	178.0638
USL	190.00	x_{max}	180.25	$\bar{x}$+3s	180.5462
T	20.00	R	1.75	6s	2.4825
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	8.06
Critical capability index	=	C_{mk}	7.50

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

Ser.No.	GC0060l	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,86
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,94
				USL	4,85
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	4,03	3,95	3,88	3,94	4,03	3,95	3,96	3,88	3,96	4,02
5376169	5413-5392/304	179,00	179,75	180,00	179,25	178,50	179,25	179,50	180,00	179,50	178,75

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	3,99	3,90	3,85	3,98	4,00	3,96	3,89	3,88	3,95	4,01
5376169	5413-5392/304	179,25	179,25	179,75	179,00	178,75	179,25	180,00	179,50	179,50	178,75

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	3,97	3,90	3,85	3,90	3,96	3,96	3,87	3,85	3,97	3,94
5376169	5413-5392/304	179,25	179,50	180,00	179,00	178,75	179,25	179,75	180,00	178,75	179,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	3,87	3,88	3,90	4,01	3,93	3,89	3,83	3,91	3,97	3,89
5376169	5413-5392/304	179,75	179,75	179,00	179,00	179,00	179,75	179,50	179,25	179,00	179,25

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	3,90	3,84	3,98	3,96	3,91	3,87	3,83	3,94	3,91	3,88
5376169	5413-5392/304	179,75	179,75	179,00	178,75	179,00	179,50	179,75	179,25	179,00	179,75

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	3,83	3,91	3,97	3,91	3,90	3,80	3,88	3,95	3,89	3,85
5376169	5413-5392/304	179,75	179,50	178,50	178,75	179,50	179,75	179,50	179,00	179,25	179,75

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	3,83	3,91	3,93	3,89	3,90	3,80	3,92	3,99	3,92	3,86
5376169	5413-5392/304	180,25	179,50	179,00	179,25	179,50	179,50	179,25	179,00	178,50	179,50

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	3,84	3,86	3,89	3,90	3,88	3,86	3,81	3,94	3,90	3,88
5376169	5413-5392/304	179,75	179,25	179,00	178,75	179,00	179,50	179,75	179,00	179,00	179,25

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

Ser.No.	GC0060l	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,86
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,94
				USL	4,85
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	3,87	3,81	3,91	3,92	3,86	3,87	3,82	3,91	3,90	3,90
5376169	5413-5392/304	180,00	179,75	178,75	178,75	179,25	179,50	179,50	178,50	178,75	179,50

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	3,80	3,85	3,95	3,94	3,88	3,80	3,90	3,96	3,90	3,84
5376169	5413-5392/304	179,75	179,75	178,50	179,25	179,25	179,75	179,25	178,75	179,25	179,50

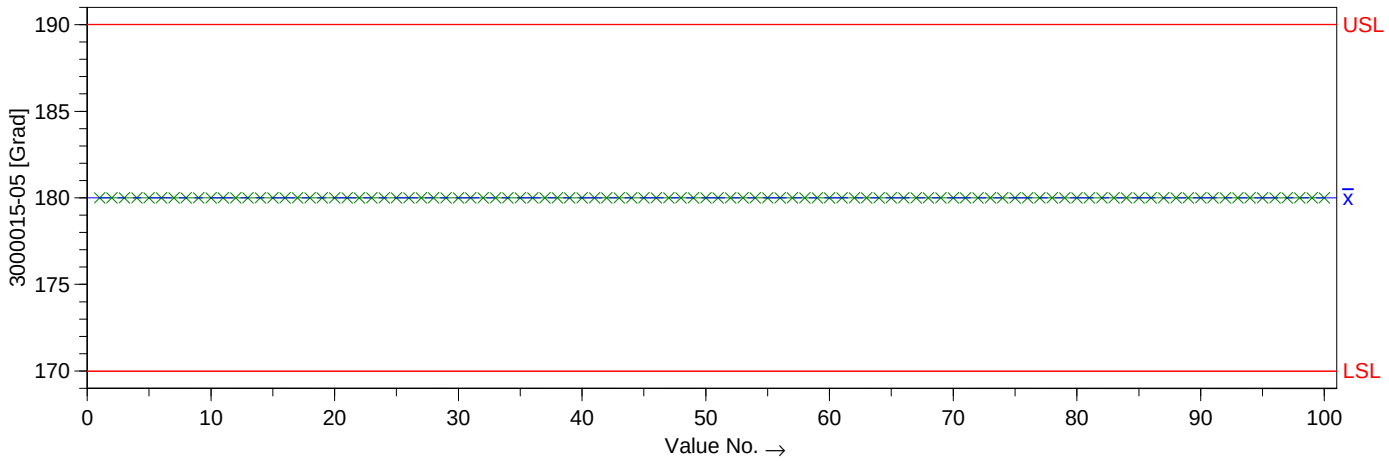
Machine Capability Study
Tool System

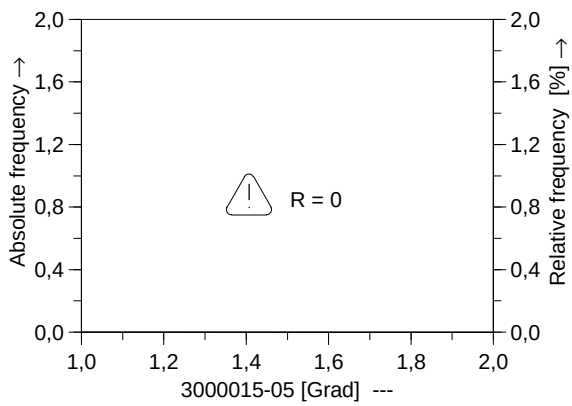
Plant ATG Lexington		Operator Name M. SHERMAN	Date 09.07.2021

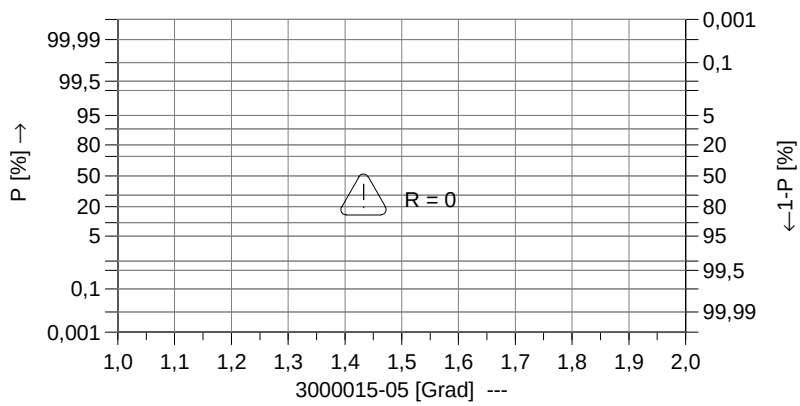
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060l	Char.Descr. 3000015-05	Inspection Val. 180,00	10,00	USL 190,00	
	Serial No. 177718	Unit Grad	-10,00	LSL 170,00	
Char.Type variable		Tolerance value 6 %		Decimal Pl. 2	
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 09.07.2021 13:21:39 to 09.07.2021 13:51:22

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM







Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	180.0000
LSL	170.00	x_{min}	180.00		
USL	190.00	x_{max}	180.00		
T	20.00	R	0.00		
		$n_{<T>}$	100		
		$n_{>USL}$	0		
		$n_{<LSL}$	0		
		n_{eff}	100		
		n_{tot}	100		

--- R = 0 ---

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

Ser.No.	GC0060l	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,02
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	4,85
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	3,98	3,90	3,84	3,92	3,98	3,92	3,89	3,82	3,93	4,01
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	3,94	3,87	3,81	3,94	3,96	3,90	3,83	3,85	3,91	3,98
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	3,94	3,88	3,80	3,89	3,95	3,89	3,83	3,81	3,92	3,94
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	3,84	3,82	3,86	3,98	3,90	3,84	3,77	3,89	3,95	3,86
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	3,86	3,80	3,93	3,92	3,89	3,82	3,78	3,92	3,89	3,83
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	3,79	3,88	3,95	3,87	3,86	3,78	3,85	3,94	3,86	3,77
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	3,78	3,88	3,93	3,88	3,85	3,80	3,89	3,96	3,89	3,82
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	3,81	3,84	3,89	3,88	3,84	3,80	3,78	3,92	3,86	3,85
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

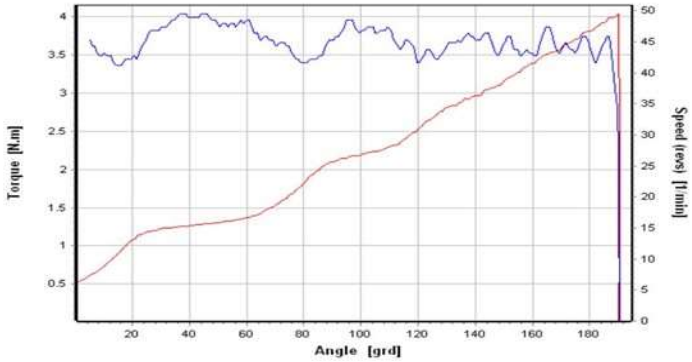
Ser.No.	GC0060l	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,02
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	4,85
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	3,83	3,78	3,87	3,90	3,82	3,81	3,78	3,89	3,86	3,87
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

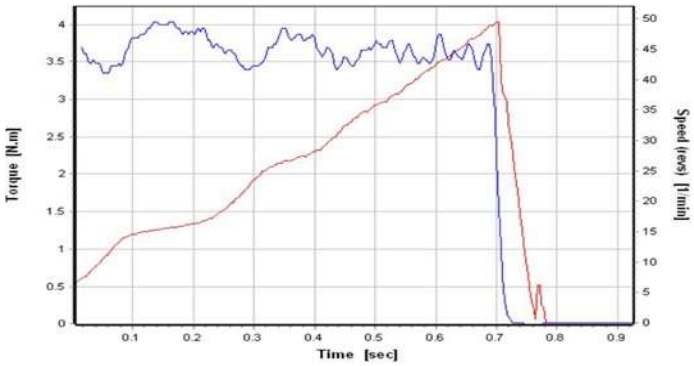
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	3,80	3,81	3,93	3,92	3,82	3,77	3,85	3,96	3,88	3,80
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Torque graphs

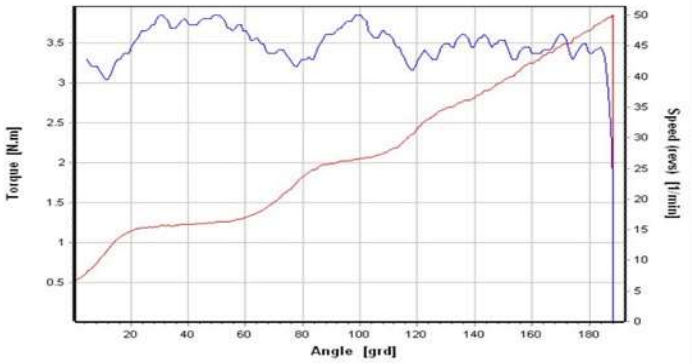
Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool without angle correction	



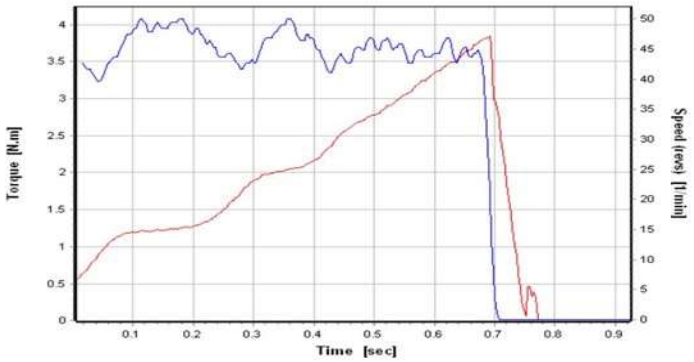
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

General Specifications

Manufacturer: Apex Tool Group **Tool type:** Cordless Assembly Tools

Model: CTBPW05Q **Serial no:** GC0060

Torque range: **1.1 Nm to 4.9 Nm**

Difference evaluation: Reference/Tool at 180 ° / 80%

Capability examination

Snugfit value: 0.98 Nm **Torque tolerance ±** 7 %

Target torque: 3.92 Nm Tolerance: 5.37 % ± **2.68 %**

Angle degree: 180° Tolerance: 6.4° ± **3.2°**

Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

Tool with angle correction

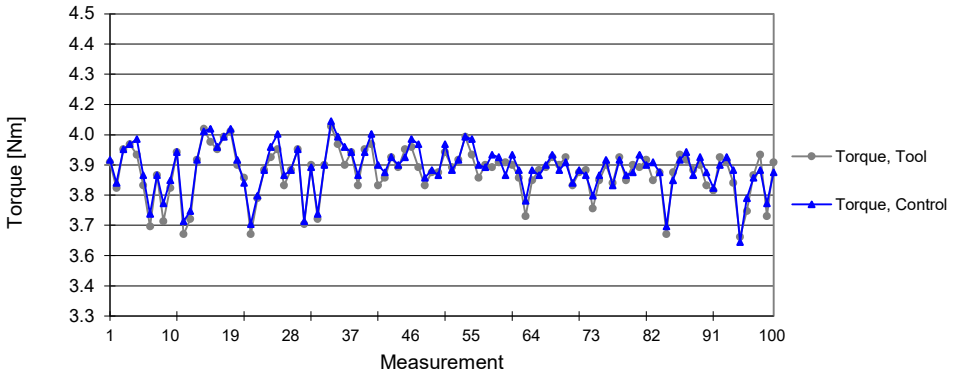
For measurements, the screwdriver must be held by hand and alternately moved.
In the column "Move +", the angle range in the screw direction,
In the column "Move -" of the direction opposite the direction of tightening,
within this range, the tool has to be moved.
Pay attention to changing angle values and directions of movement.
The indicated maximum values for "Move +" and "Move -"
have per measurement series minimum 5 times.

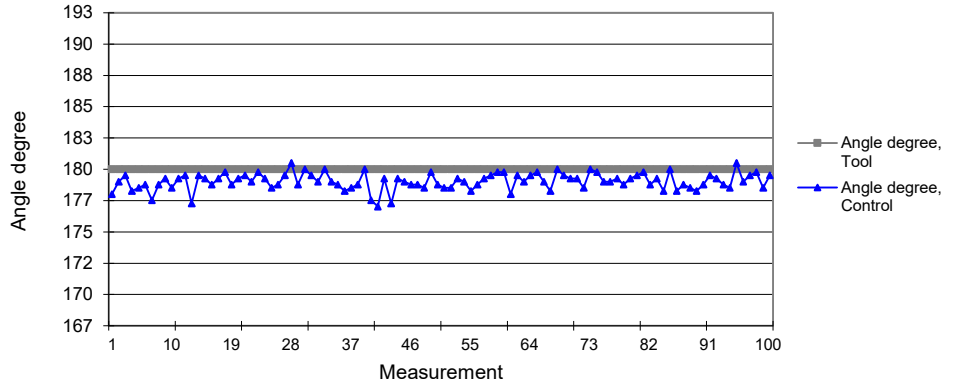
Move		Test conditions
+	-	0
0-25°	0-45°	Tool hand held

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	3.93	180.00	3.94	178.00	0.01	2.00
2	3.83	180.00	3.85	179.00	0.02	1.00
3	3.98	180.00	3.98	179.50	0.00	0.50
4	4.00	180.00	4.00	178.25	0.00	1.75
5	3.96	180.00	4.02	178.50	0.06	1.50
6	3.84	180.00	3.88	178.75	0.04	1.25
7	3.68	180.00	3.73	177.50	0.05	2.50
8	3.88	180.00	3.88	178.75	0.00	1.25
9	3.70	180.00	3.77	179.25	0.07	0.75
10	3.83	180.00	3.86	178.50	0.03	1.50
11	3.97	180.00	3.97	179.25	0.00	0.75
12	3.65	180.00	3.70	179.50	0.05	0.50
13	3.71	180.00	3.74	177.25	0.03	2.75
14	3.94	180.00	3.94	179.50	0.00	0.50
15	4.06	180.00	4.05	179.25	0.01	0.75
16	4.01	180.00	4.06	178.75	0.05	1.25
17	3.98	180.00	3.99	179.25	0.01	0.75
18	4.03	180.00	4.03	179.75	0.00	0.25
19	4.05	180.00	4.06	178.75	0.01	1.25
20	3.92	180.00	3.94	179.25	0.02	0.75
21	3.87	180.00	3.85	179.50	0.02	0.50
22	3.65	180.00	3.69	179.00	0.04	1.00
23	3.79	180.00	3.80	179.75	0.01	0.25
24	3.90	180.00	3.90	179.25	0.00	0.75
25	3.95	180.00	3.99	178.50	0.04	1.50
26	3.98	180.00	4.04	178.75	0.06	1.25
27	3.84	180.00	3.88	179.50	0.04	0.50
28	3.90	180.00	3.90	180.50	0.00	0.50
29	3.98	180.00	3.98	178.75	0.00	1.25
30	3.69	180.00	3.70	180.00	0.01	0.00
31	3.92	180.00	3.91	179.50	0.01	0.50
32	3.71	180.00	3.73	179.00	0.02	1.00
33	3.92	180.00	3.92	180.00	0.00	0.00
34	4.07	180.00	4.09	179.00	0.02	1.00
35	4.00	180.00	4.03	178.75	0.03	1.25
36	3.92	180.00	3.99	178.25	0.07	1.75
37	3.97	180.00	3.97	178.50	0.00	1.50
38	3.84	180.00	3.88	178.75	0.04	1.25
39	3.98	180.00	3.97	180.00	0.01	0.00
40	4.00	180.00	4.04	177.50	0.04	2.50
41	3.84	180.00	3.92	177.00	0.08	3.00
42	3.87	180.00	3.89	179.25	0.02	0.75
43	3.95	180.00	3.95	177.25	0.00	2.75
44	3.91	180.00	3.92	179.25	0.01	0.75
45	3.98	180.00	3.95	179.00	0.03	1.00
46	3.99	180.00	4.02	178.75	0.03	1.25
47	3.91	180.00	4.00	178.75	0.09	1.25
48	3.84	180.00	3.87	178.50	0.03	1.50
49	3.89	180.00	3.90	179.75	0.01	0.25
50	3.89	180.00	3.88	178.75	0.01	1.25
51	3.97	180.00	4.00	178.50	0.03	1.50
52	3.91	180.00	3.90	178.50	0.01	1.50
53	3.94	180.00	3.94	179.25	0.00	0.75
54	4.03	180.00	4.03	179.00	0.00	1.00
55	3.96	180.00	4.02	178.25	0.06	1.75
56	3.87	180.00	3.92	178.75	0.05	1.25
57	3.92	180.00	3.91	179.25	0.01	0.75
58	3.91	180.00	3.96	179.50	0.05	0.50
59	3.93	180.00	3.95	179.75	0.02	0.25
60	3.93	180.00	3.88	179.75	0.05	0.25
61	3.92	180.00	3.96	178.00	0.04	2.00
62	3.87	180.00	3.90	179.50	0.03	0.50
63	3.72	180.00	3.78	179.00	0.06	1.00
64	3.86	180.00	3.90	179.50	0.04	0.50
65	3.90	180.00	3.88	179.75	0.02	0.25
66	3.91	180.00	3.92	179.00	0.01	1.00
67	3.95	180.00	3.96	178.25	0.01	1.75
68	3.92	180.00	3.90	180.00	0.02	0.00
69	3.95	180.00	3.93	179.50	0.02	0.50
70	3.84	180.00	3.85	179.25	0.01	0.75
71	3.89	180.00	3.90	179.25	0.01	0.75
72	3.90	180.00	3.88	178.50	0.02	1.50
73	3.75	180.00	3.80	180.00	0.05	0.00
74	3.86	180.00	3.88	179.75	0.02	0.25
75	3.92	180.00	3.94	179.00	0.02	1.00
76	3.85	180.00	3.84	179.00	0.01	1.00
77	3.95	180.00	3.94	179.25	0.01	0.75
78	3.86	180.00	3.88	178.75	0.02	1.25
79	3.92	180.00	3.89	179.25	0.03	0.75
80	3.91	180.00	3.96	179.50	0.05	0.50
81	3.94	180.00	3.92	179.75	0.02	0.25
82	3.86	180.00	3.93	178.75	0.07	1.25
83	3.89	180.00	3.89	179.25	0.00	0.75
84	3.65	180.00	3.68	178.25	0.03	1.75
85	3.89	180.00	3.86	180.00	0.03	0.00
86	3.96	180.00	3.94	178.25	0.02	1.75
87	3.94	180.00	3.97	178.75	0.03	1.25
88	3.90	180.00	3.88	178.50	0.02	1.50
89	3.92	180.00	3.95	178.25	0.03	1.75
90	3.84	180.00	3.89	178.75	0.05	1.25
91	3.82	180.00	3.83	179.50	0.01	0.50
92	3.95	180.00	3.92	179.25	0.03	0.75
93	3.93	180.00	3.95	178.75	0.02	1.25
94	3.85	180.00	3.90	178.50	0.05	1.50
95	3.64	180.00	3.62	180.50	0.02	0.50
96	3.74	180.00	3.79	179.00	0.05	1.00
97	3.88	180.00	3.87	179.50	0.01	0.50
98	3.96	180.00	3.90	179.75	0.06	0.25
99	3.72	180.00	3.77	178.50	0.05	1.50
100	3.93	180.00	3.89	179.50	0.04	0.50
				Standard deviation:	**0.021**	**0.639**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool with angle correction	





Machine Capability Study
Control System

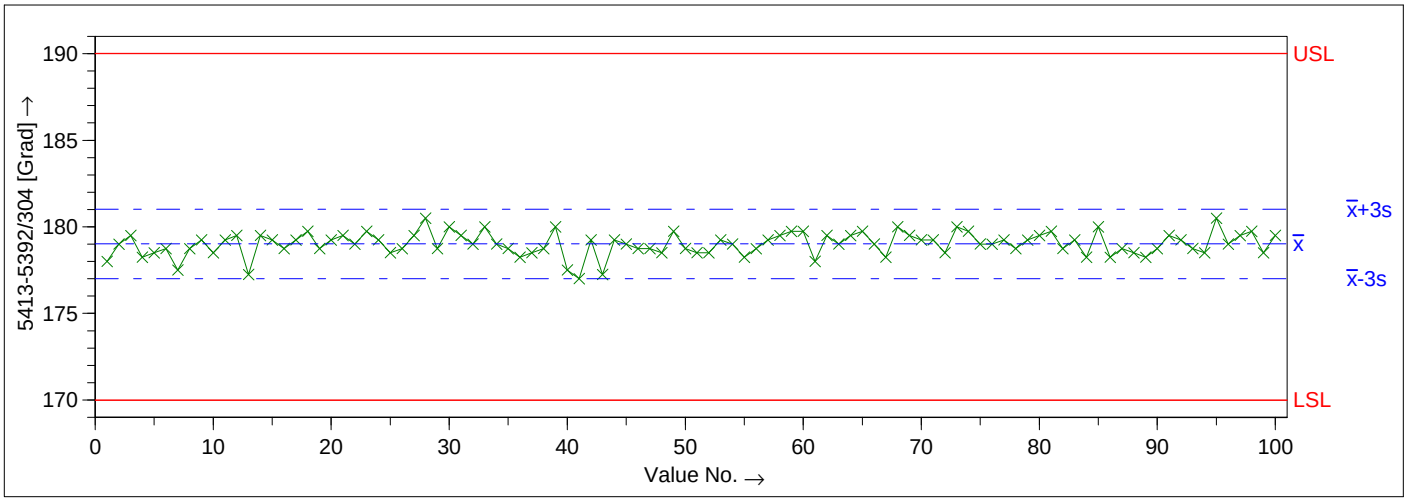
Cleco Production Tools

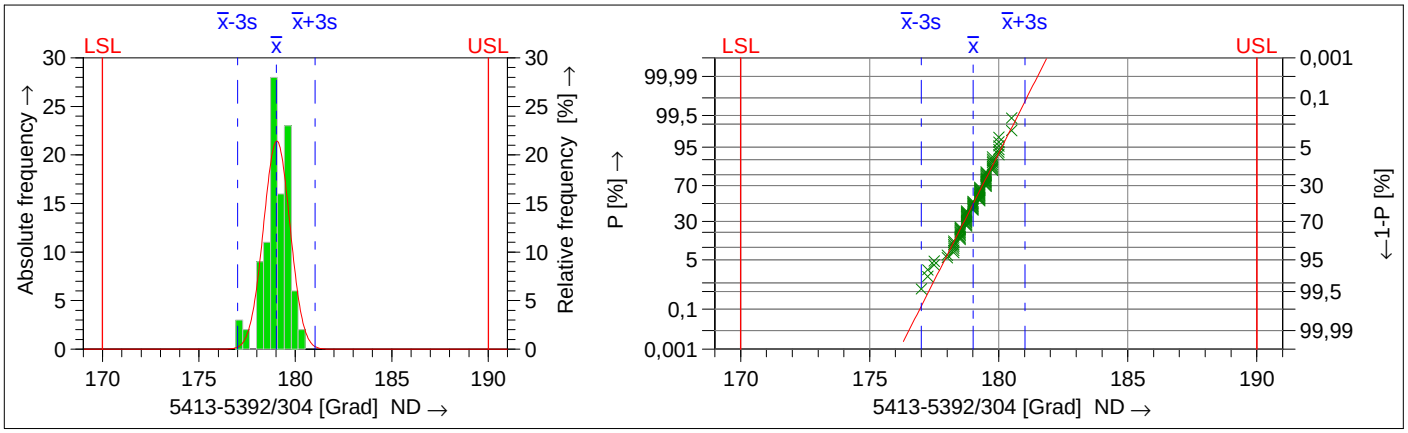
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	03.08.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0060n	Char.Descr.	5413-5392/304	Inspection Val.	180,00 10,00	USL	190,00
		Serial No.	5376169	Unit	Grad -10,00	LSL	170,00
Char.Type	variable			Tolerance value	6 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 03.08.2021 01:46:34 to 03.08.2021 02:06:46

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope





Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	179.0125
LSL	170.00	x_{min}	177.00	$\bar{x}$-3s	177.0029
USL	190.00	x_{max}	180.50	$\bar{x}$+3s	181.0221
T	20.00	R	3.50	6s	4.0191
		$n_{<T>}$	100	$p_{<T>}$	100.00000 %
		$n_{>USL}$	0	$p_{>USL}$	0.00000%
		$n_{<LSL}$	0	$p_{<LSL}$	0.00000%
		n_{eff}	100		
		n_{tot}	100		

Model distribution			Normal Distribution
Calculation method			$M1_{1.4}$ $\hat{\sigma} = s_{tot}$
Potential Capability index	=	C_m	4.98
Critical capability index	=	C_{mk}	4.48

The requirements were met (C_m,C_{mk})

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060n	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,85
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,90
				USL	4,90
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
5376169	5413-5392/304	3,94	3,85	3,98	4,00	4,02	3,88	3,73	3,88	3,77	3,86
5376169	5413-5392/304	178,00	179,00	179,50	178,25	178,50	178,75	177,50	178,75	179,25	178,50

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
5376169	5413-5392/304	3,97	3,70	3,74	3,94	4,05	4,06	3,99	4,03	4,06	3,94
5376169	5413-5392/304	179,25	179,50	177,25	179,50	179,25	178,75	179,25	179,75	178,75	179,25

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	3,85	3,69	3,80	3,90	3,99	4,04	3,88	3,90	3,98	3,70
5376169	5413-5392/304	179,50	179,00	179,75	179,25	178,50	178,75	179,50	180,50	178,75	180,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
5376169	5413-5392/304	3,91	3,73	3,92	4,09	4,03	3,99	3,97	3,88	3,97	4,04
5376169	5413-5392/304	179,50	179,00	180,00	179,00	178,75	178,25	178,50	178,75	180,00	177,50

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
5376169	5413-5392/304	3,92	3,89	3,95	3,92	3,95	4,02	4,00	3,87	3,90	3,88
5376169	5413-5392/304	177,00	179,25	177,25	179,25	179,00	178,75	178,75	178,50	179,75	178,75

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
5376169	5413-5392/304	4,00	3,90	3,94	4,03	4,02	3,92	3,91	3,96	3,95	3,88
5376169	5413-5392/304	178,50	178,50	179,25	179,00	178,25	178,75	179,25	179,50	179,75	179,75

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
5376169	5413-5392/304	3,96	3,90	3,78	3,90	3,88	3,92	3,96	3,90	3,93	3,85
5376169	5413-5392/304	178,00	179,50	179,00	179,50	179,75	179,00	178,25	180,00	179,50	179,25

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
5376169	5413-5392/304	3,90	3,88	3,80	3,88	3,94	3,84	3,94	3,88	3,89	3,96
5376169	5413-5392/304	179,25	178,50	180,00	179,75	179,00	179,00	179,25	178,75	179,25	179,50

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060n	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,85
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,90
				USL	4,90
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
5376169	5413-5392/304	3,92	3,93	3,89	3,68	3,86	3,94	3,97	3,88	3,95	3,89
5376169	5413-5392/304	179,75	178,75	179,25	178,25	180,00	178,25	178,75	178,50	178,25	178,75

Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
5376169	5413-5392/304	3,83	3,92	3,95	3,90	3,62	3,79	3,87	3,90	3,77	3,89
5376169	5413-5392/304	179,50	179,25	178,75	178,50	180,50	179,00	179,50	179,75	178,50	179,50

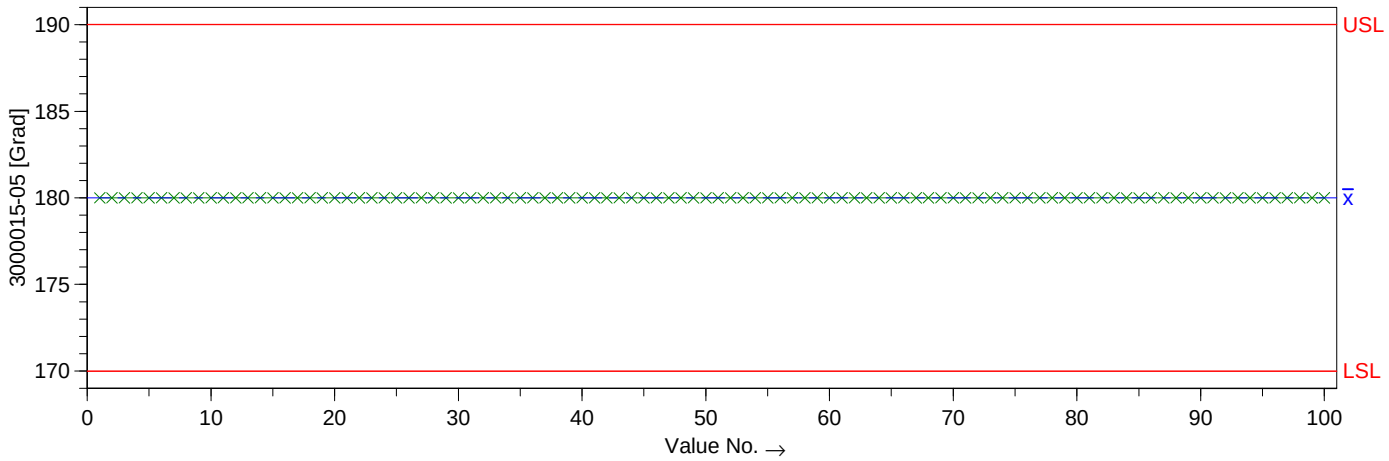
Machine Capability Study
Tool System

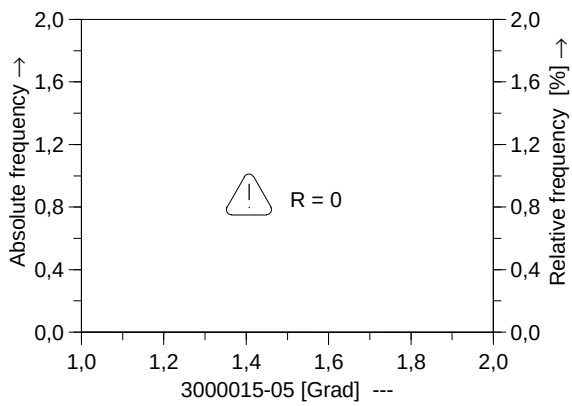
Plant ATG Lexington		Operator Name M. SHERMAN	Date 03.08.2021

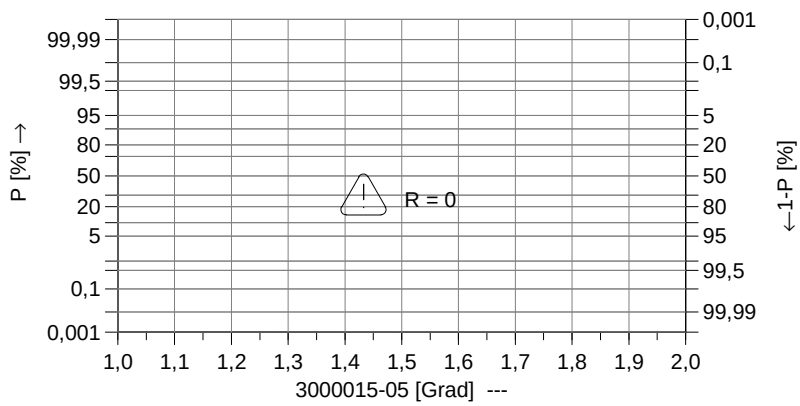
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0060n	Char.Descr. 3000015-05	Inspection Val. 180,00	10,00	USL 190,00	
	Serial No. 177718	Unit Grad	-10,00	LSL 170,00	
Char.Type variable		Tolerance value 6 %		Decimal Pl. 2	
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 03.08.2021 13:46:33 to 03.08.2021 14:06:44

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope







Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	180.0000
LSL	170.00	x_{min}	180.00		
USL	190.00	x_{max}	180.00		
T	20.00	R	0.00		
		$n_{<T>}$	100		
		$n_{>USL}$	0		
		$n_{<LSL}$	0		
		n_{eff}	100		
		n_{tot}	100		

--- R = 0 ---

APEX VDI/VDE 2647 V0.1

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0060n	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,04
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	4,88
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}
177718	3000015-05	3,93	3,83	3,98	4,00	3,96	3,84	3,68	3,88	3,70	3,83
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177718	3000015-05	3,97	3,65	3,71	3,94	4,06	4,01	3,98	4,03	4,05	3,92
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177718	3000015-05	3,87	3,65	3,79	3,90	3,95	3,98	3,84	3,90	3,98	3,69
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177718	3000015-05	3,92	3,71	3,92	4,07	4,00	3,92	3,97	3,84	3,98	4,00
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177718	3000015-05	3,84	3,87	3,95	3,91	3,98	3,99	3,91	3,84	3,89	3,89
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177718	3000015-05	3,97	3,91	3,94	4,03	3,96	3,87	3,92	3,91	3,93	3,93
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177718	3000015-05	3,92	3,87	3,72	3,86	3,90	3,91	3,95	3,92	3,95	3,84
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177718	3000015-05	3,89	3,90	3,75	3,86	3,92	3,85	3,95	3,86	3,92	3,91
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

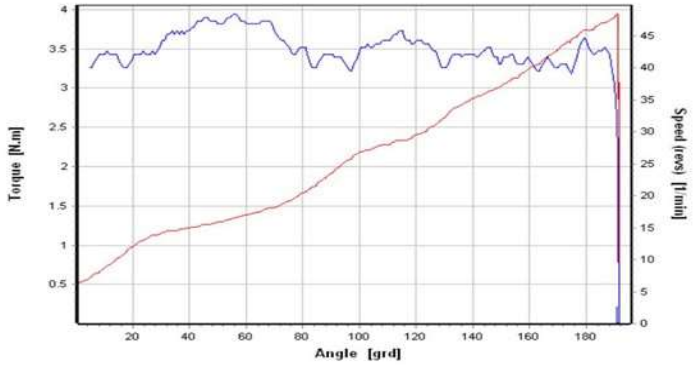
Ser.No.	GC0060n	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,04
Ord. No.	CTBPW05Q	Ser.No.	177718	LSL	0,00
				USL	4,88
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.85 Nm; Cu r-Cal: 0.0393 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177718	3000015-05	3,94	3,86	3,89	3,65	3,89	3,96	3,94	3,90	3,92	3,84
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

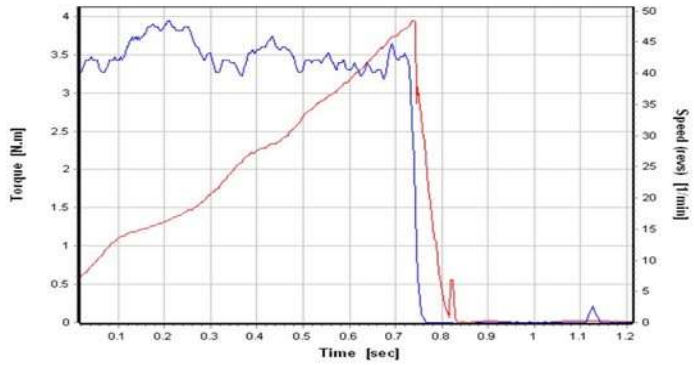
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177718	3000015-05	3,82	3,95	3,93	3,85	3,64	3,74	3,88	3,96	3,72	3,93
177718	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Torque graphs

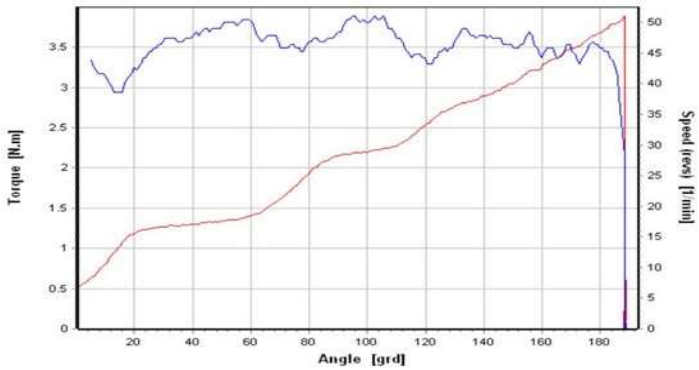
Model:	**CTBPW05Q**	Serial no:	**GC0060**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool with angle correction	



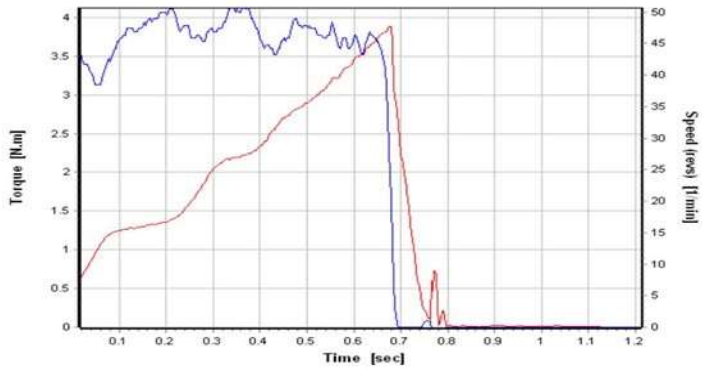
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed