Homologation

Cordless Assembly Tools

Model: CTBPW05Q

Serial no.: GC0059

Contents

Homologation: CTBPW05Q SN: GC0059

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

Test sheet no. 2

Machine Capability Study 30 %

Multi-stage tightening system	☑	Speed 50 rpm	1.42 %
Single-stage tightening system	☐	Speed 100 %	3525 rpm

Manufacturer: Apex Tool Group Serial no: **GC0059**

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

Hard joint (H)	13.48	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	2.25 Nm	2.22 Nm
	Standard deviation	0.01 Nm	0.01 Nm
	Torque scatter (99,73%)	0.07 Nm	0.07 Nm
	C_m	4.29	4.52
	C_{mk}	4.10	4.07

b)	Min. C_m hard/soft (lowest value)	4.29
	Min. C_{mk} hard/soft (lowest value)	4.07

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

Note:

Machine Capability Study
Control System

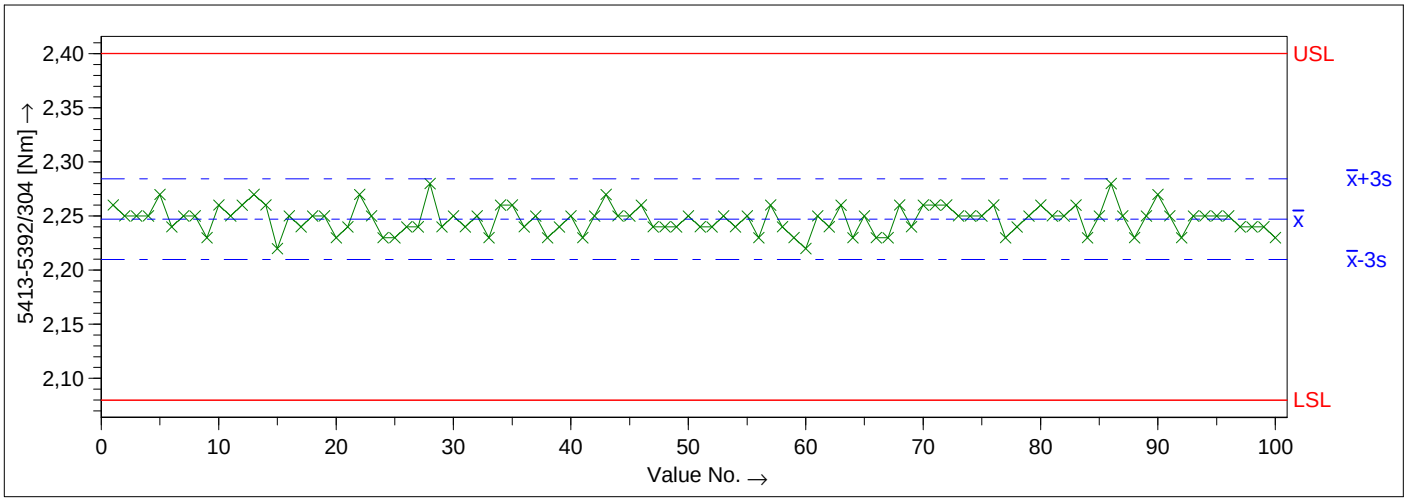
Cleco Production Tools

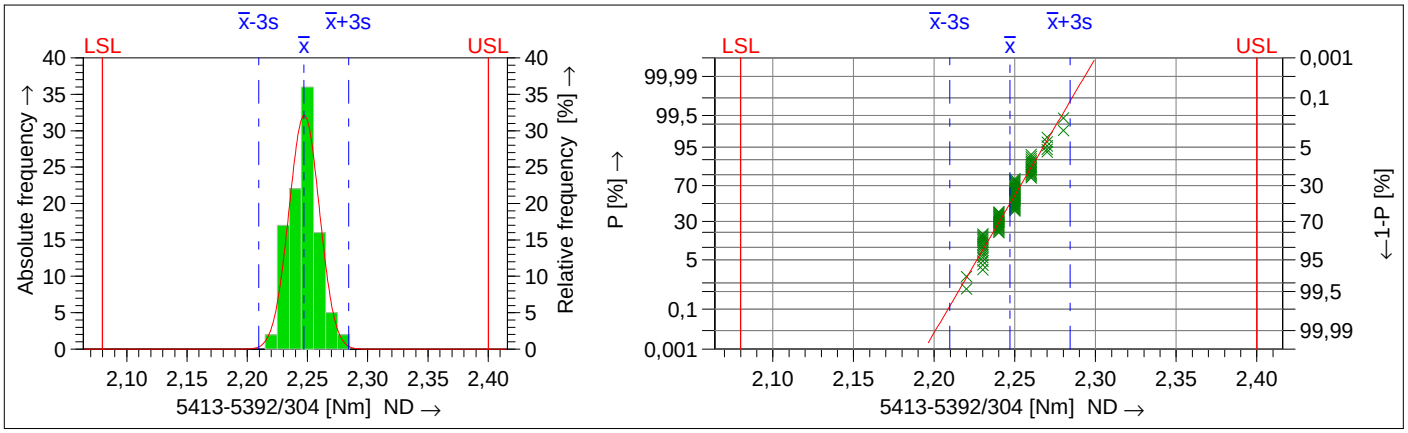
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	25.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059d	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 25.03.2021 02:55:36 to 25.03.2021 03:17:03

Rem. TQ 30% hard +/-7% * TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2470
LSL	2.08	x_{min}	2.22	$\bar{x}$-3s	2.2097
USL	2.40	x_{max}	2.28	$\bar{x}$+3s	2.2843
T	0.32	R	0.06	6s	0.0746
		$n_{<T>}$	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	4.29
Critical capability index	=	C_{mk}	4.10

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 25.03.2021

Ser.No.	GC0059d	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: 5.86 Nm; Cur-Cal:0.0384 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	2,25	2,25	2,25	2,27	2,24	2,25	2,25	2,23	2,26
5376169	5413-5392/304	30,25	30,25	30,00	29,75	31,00	30,00	31,00	29,75	30,00	29,75

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	2,25	2,26	2,27	2,26	2,22	2,25	2,24	2,25	2,25	2,23
5376169	5413-5392/304	30,25	30,00	30,00	30,50	29,75	29,50	29,50	30,25	30,25	30,25

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	2,24	2,27	2,25	2,23	2,23	2,24	2,24	2,28	2,24	2,25
5376169	5413-5392/304	31,00	31,25	31,25	30,50	29,25	29,75	29,75	30,50	29,75	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	2,24	2,25	2,23	2,26	2,26	2,24	2,25	2,23	2,24	2,25
5376169	5413-5392/304	30,50	30,75	29,50	30,50	30,00	29,25	30,75	30,00	29,50	29,50

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	2,23	2,25	2,27	2,25	2,25	2,26	2,24	2,24	2,24	2,25
5376169	5413-5392/304	29,25	30,50	30,25	29,75	30,50	30,25	30,00	30,00	29,25	30,25

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	2,24	2,24	2,25	2,24	2,25	2,23	2,26	2,24	2,23	2,22
5376169	5413-5392/304	29,25	30,00	30,50	30,25	30,25	29,75	30,75	30,00	30,00	29,50

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	2,25	2,24	2,26	2,23	2,25	2,23	2,23	2,26	2,24	2,26
5376169	5413-5392/304	30,00	30,50	30,25	29,25	30,50	29,50	29,25	30,00	30,25	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	2,26	2,26	2,25	2,25	2,25	2,26	2,23	2,24	2,25	2,26
5376169	5413-5392/304	30,75	30,75	30,25	30,75	30,00	30,50	30,00	30,00	30,00	30,25

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059d	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: 5.86 Nm; Cur-Cal:0.0384 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	2,25	2,25	2,26	2,23	2,25	2,28	2,25	2,23	2,25	2,27
5376169	5413-5392/304	30,50	29,75	30,75	30,00	30,50	30,50	30,75	30,50	30,25	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}
5376169	5413-5392/304	2,25	2,23	2,25	2,25	2,25	2,25	2,24	2,24	2,24	2,23
5376169	5413-5392/304	31,25	30,00	30,50	30,25	30,75	30,25	30,25	30,75	30,75	30,75

Machine Capability Study
Tool System

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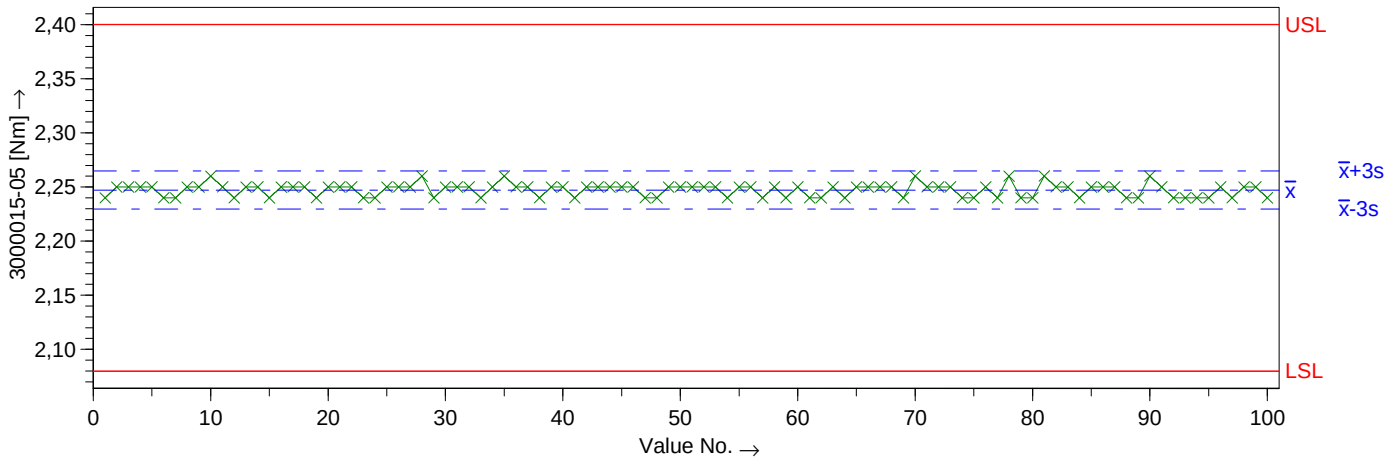
Plant ATG Lexington		Operator Name M. SHERMAN	Date 25.03.2021

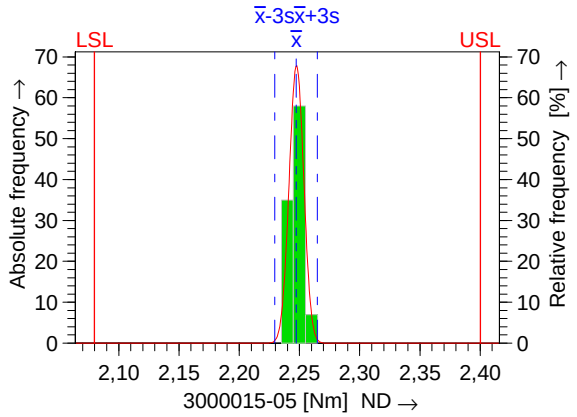
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059d	Char.Descr. 3000015-05	Inspection Val.	2,24	0,16	USL 2,40
	Serial No. 177705	Unit	Nm	-0,16	LSL 2,08
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2

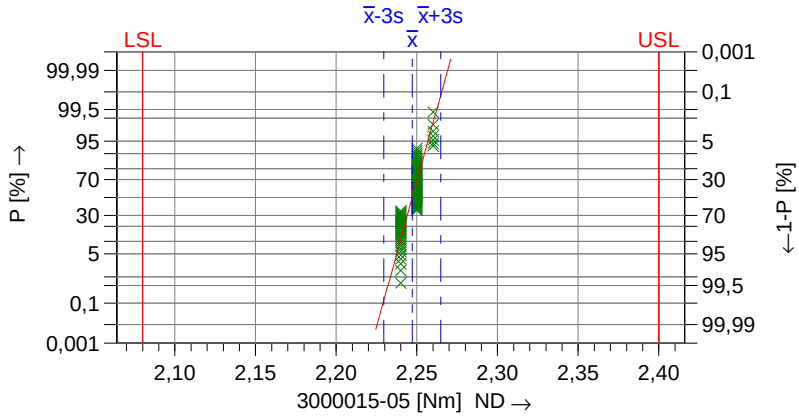
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100

Evaluation from 25.03.2021 14:54:32 to 25.03.2021 15:17:02

Rem. TQ 30% hard +/-7% * TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;







Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2472
LSL	2.08	x_{min}	2.24	$\bar{x}$-3s	2.2296
USL	2.40	x_{max}	2.26	$\bar{x}$+3s	2.2648
T	0.32	R	0.02	6s	0.0352
		$n_{<T>}$	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	9.08
Critical capability index	=	C_{mk}	8.67

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 25.03.2021

Ser.No.	GC0059d	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	2,24	2,25	2,25	2,25	2,25	2,24	2,24	2,25	2,25	2,26
177705	3000015-05	30,00	30,00	30,00	30,00	31,00	30,00	31,00	30,00	30,00	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}
177705	3000015-05	2,25	2,24	2,25	2,25	2,24	2,25	2,25	2,25	2,24	2,25
177705	3000015-05	30,00	30,00	30,00	31,00	30,00	29,00	29,00	30,00	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}
177705	3000015-05	2,25	2,25	2,24	2,24	2,25	2,25	2,25	2,26	2,24	2,25
177705	3000015-05	31,00	31,00	31,00	30,00	29,00	30,00	30,00	31,00	30,00	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}
177705	3000015-05	2,25	2,25	2,24	2,25	2,26	2,25	2,25	2,24	2,25	2,25
177705	3000015-05	30,00	30,00	30,00	30,00	30,00	29,00	31,00	30,00	29,00	29,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177705	3000015-05	2,24	2,25	2,25	2,25	2,25	2,25	2,24	2,24	2,25	2,25
177705	3000015-05	29,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	29,00	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}
177705	3000015-05	2,25	2,25	2,25	2,24	2,25	2,25	2,24	2,25	2,24	2,25
177705	3000015-05	29,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	30,00	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}
177705	3000015-05	2,24	2,24	2,25	2,24	2,25	2,25	2,25	2,25	2,24	2,26
177705	3000015-05	30,00	30,00	30,00	29,00	31,00	30,00	29,00	30,00	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}
177705	3000015-05	2,25	2,25	2,25	2,24	2,24	2,25	2,24	2,26	2,24	2,24
177705	3000015-05	30,00	31,00	30,00	31,00	30,00	30,00	30,00	30,00	30,00	30,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059d	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	2,08
				USL	2,40
Remark	TQ 30% hard +/-7% * TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	2,26	2,25	2,25	2,24	2,25	2,25	2,25	2,24	2,24	2,26
177705	3000015-05	30,00	30,00	30,00	30,00	31,00	31,00	31,00	31,00	30,00	31,00

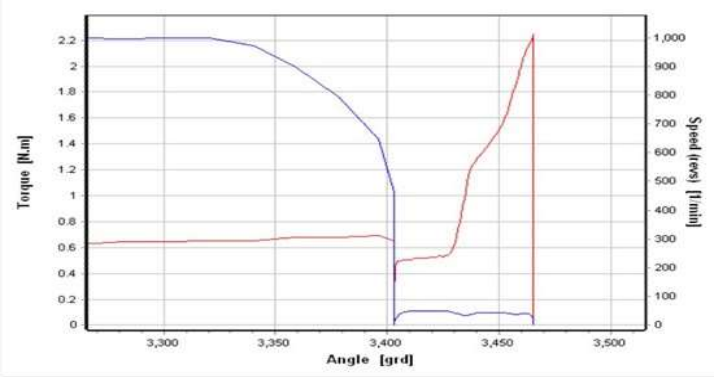
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	2,25	2,24	2,24	2,24	2,24	2,25	2,24	2,25	2,25	2,24
177705	3000015-05	31,00	30,00	30,00	30,00	30,00	30,00	30,00	31,00	31,00	31,00

Torque graphs

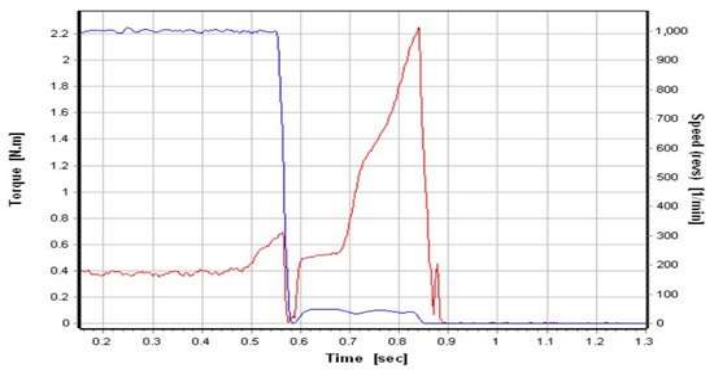
Machine Capability Study 30 %

Model: **CTBPW05Q**
Serial no: **GC0059**

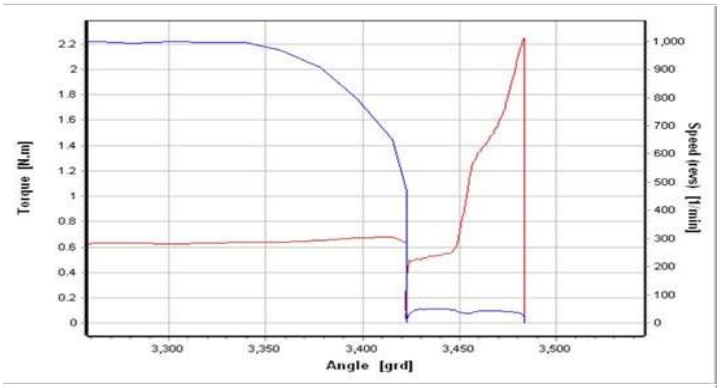
Angle degree: **30°**
Test torque: **2.2 Nm**



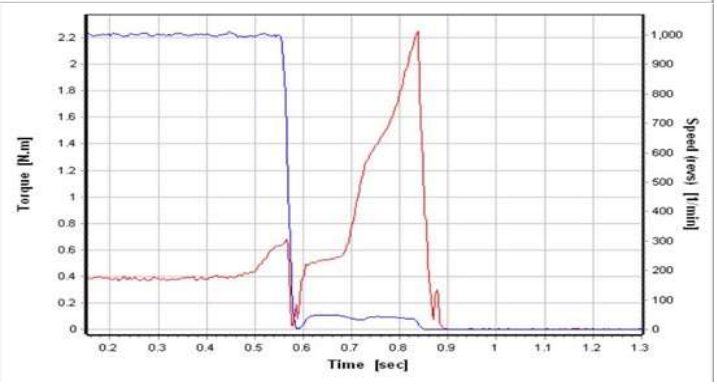
Value no. 1
Graph
Torque / Angle / Speed



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

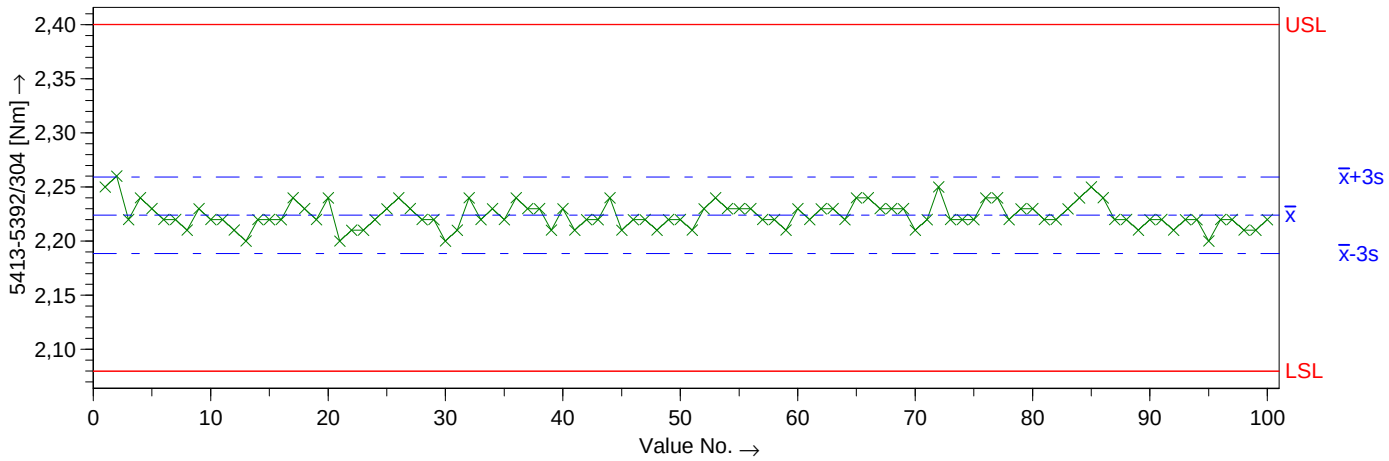
Cleco Production Tools

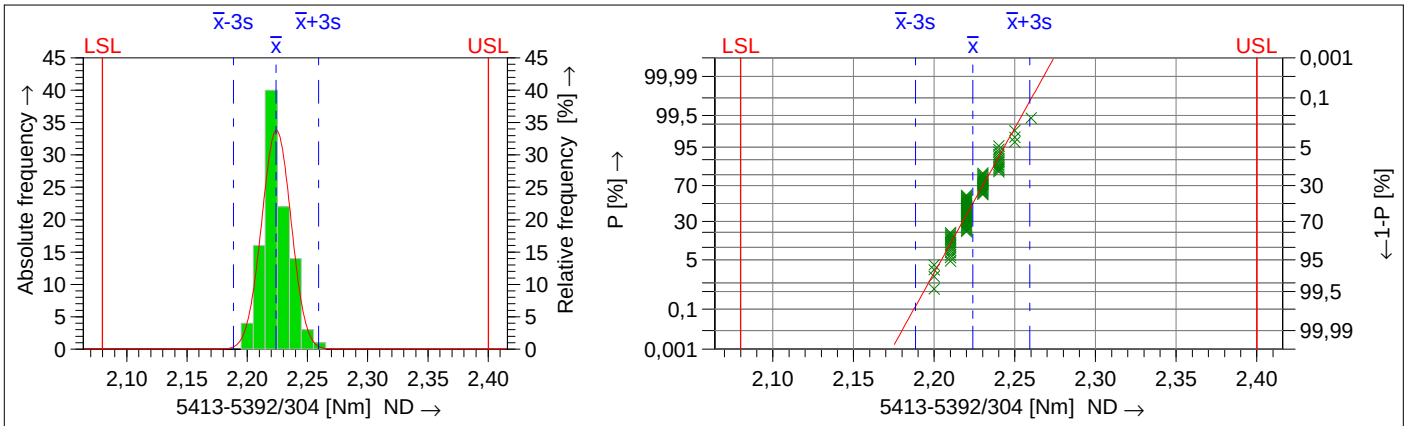
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	25.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0059c	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 25.03.2021 02:09:28 to 25.03.2021 02:40:44

Rem. TQ 30% soft +/-7% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2239
LSL	2.08	x_{min}	2.20	$\bar{x}$-3s	2.1885
USL	2.40	x_{max}	2.26	$\bar{x}$+3s	2.2593
T	0.32	R	0.06	6s	0.0708
		$n_{<T>}$	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	4.52
Critical capability index	=	C_{mk}	4.07

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 25.03.2021

Ser.No.	GC0059c	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% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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	2,25	2,26	2,22	2,24	2,23	2,22	2,22	2,21	2,23	2,22
5376169	5413-5392/304	305,75	366,50	367,25	317,75	362,00	342,75	331,50	353,00	367,00	322,50

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	2,22	2,21	2,20	2,22	2,22	2,22	2,24	2,23	2,22	2,24
5376169	5413-5392/304	316,50	325,00	331,25	334,75	356,50	354,00	324,25	330,50	372,50	346,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	2,20	2,21	2,21	2,22	2,23	2,24	2,23	2,22	2,22	2,20
5376169	5413-5392/304	340,00	370,00	362,25	321,50	362,00	337,25	322,50	345,50	347,75	319,75

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	2,21	2,24	2,22	2,23	2,22	2,24	2,23	2,23	2,21	2,23
5376169	5413-5392/304	342,00	339,25	342,25	333,50	372,00	358,50	320,00	330,75	342,75	369,50

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	2,21	2,22	2,22	2,24	2,21	2,22	2,22	2,21	2,22	2,22
5376169	5413-5392/304	388,25	389,25	415,75	340,50	340,50	366,75	348,25	358,75	409,50	371,50

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	2,21	2,23	2,24	2,23	2,23	2,23	2,22	2,22	2,21	2,23
5376169	5413-5392/304	402,25	355,25	324,50	325,75	341,25	331,00	337,75	335,25	366,00	362,25

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	2,22	2,23	2,23	2,22	2,24	2,24	2,23	2,23	2,23	2,21
5376169	5413-5392/304	348,25	391,25	355,75	370,50	346,00	337,25	349,50	357,75	364,25	350,25

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	2,22	2,25	2,22	2,22	2,22	2,24	2,24	2,22	2,23	2,23
5376169	5413-5392/304	378,75	350,25	411,25	410,25	336,00	367,00	381,50	345,50	349,25	386,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059c	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% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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	2,22	2,23	2,24	2,25	2,24	2,22	2,22	2,21	2,22
5376169	5413-5392/304	411,25	336,50	420,00	355,75	347,75	339,00	345,25	408,75	345,50	396,50

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	2,22	2,21	2,22	2,22	2,20	2,22	2,22	2,21	2,21	2,22
5376169	5413-5392/304	415,50	351,50	384,75	378,75	395,00	385,50	334,25	403,50	396,75	374,75

Machine Capability Study
Tool System

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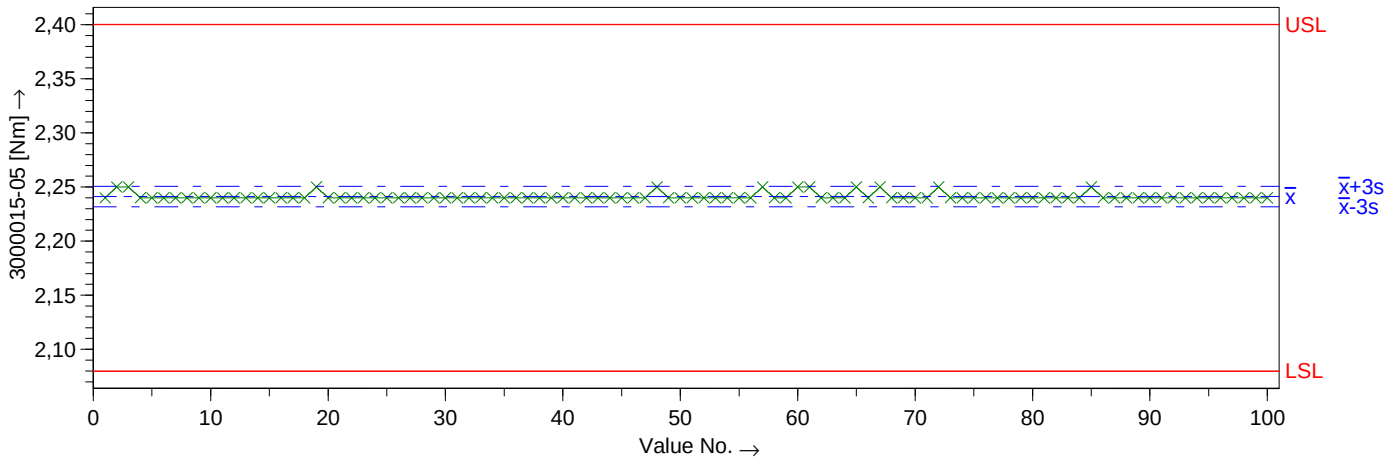
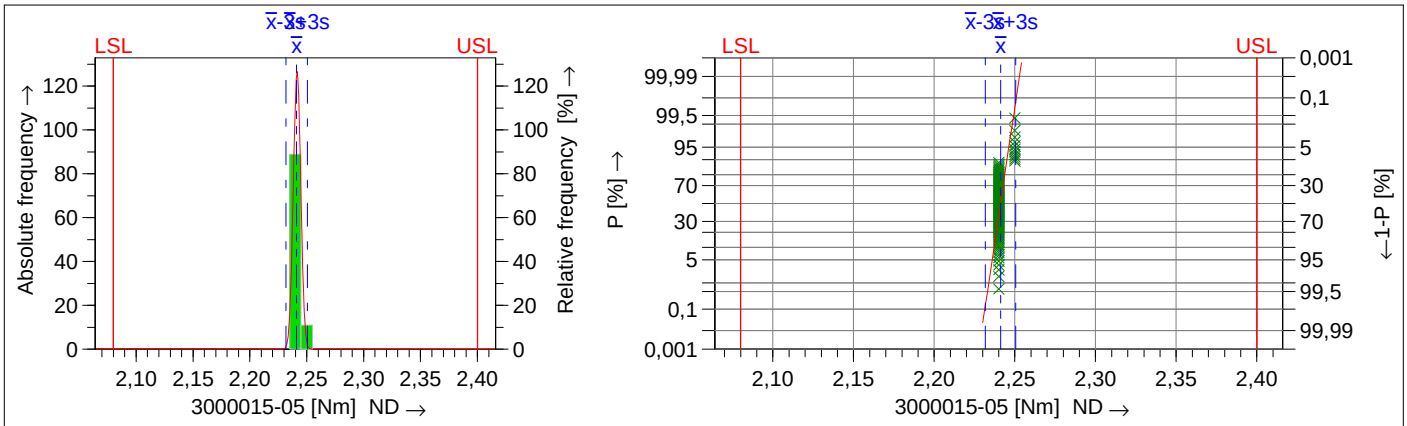
Plant ATG Lexington		Operator Name M. SHERMAN	Date 25.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059c	Char.Descr. 3000015-05	Inspection Val.	2,24	0,16	USL 2,40
	Serial No. 177705	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 25.03.2021 14:09:27 to 25.03.2021 14:39:34

Rem. TQ 30% soft +/-7% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	2.24			$\bar{x}$	2.2411
LSL	2.08	x_{min}	2.24	$\bar{x}$-3s	2.2317
USL	2.40	x_{max}	2.25	$\bar{x}$+3s	2.2505
T	0.32	R	0.01	6s	0.0189
		$n_{<T>}$	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	16.96
Critical capability index	=	C_{mk}	16.84

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 25.03.2021

Ser.No.	GC0059c	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	2,24	2,25	2,25	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	308,00	368,00	376,00	318,00	365,00	343,00	335,00	354,00	367,00	321,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,25	2,24
177705	3000015-05	318,00	326,00	336,00	339,00	359,00	354,00	323,00	331,00	383,00	346,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	341,00	374,00	364,00	323,00	362,00	337,00	323,00	347,00	349,00	325,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	347,00	339,00	346,00	335,00	374,00	360,00	320,00	332,00	346,00	372,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,25	2,24	2,24
177705	3000015-05	390,00	388,00	418,00	340,00	343,00	368,00	352,00	361,00	417,00	373,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,25	2,24	2,24	2,25
177705	3000015-05	410,00	358,00	327,00	327,00	345,00	334,00	339,00	337,00	365,00	363,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177705	3000015-05	2,25	2,24	2,24	2,24	2,25	2,24	2,25	2,24	2,24	2,24
177705	3000015-05	350,00	392,00	358,00	369,00	351,00	337,00	352,00	358,00	366,00	353,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177705	3000015-05	2,24	2,25	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	381,00	353,00	412,00	412,00	338,00	367,00	383,00	348,00	348,00	388,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059c	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,24
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	2,08
				USL	2,40
Remark	TQ 30% soft +/-7% * 30% SOFT; TQ-Cal: 5.86 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	2,24	2,24	2,24	2,24	2,25	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	412,00	341,00	422,00	356,00	351,00	339,00	348,00	411,00	348,00	398,00

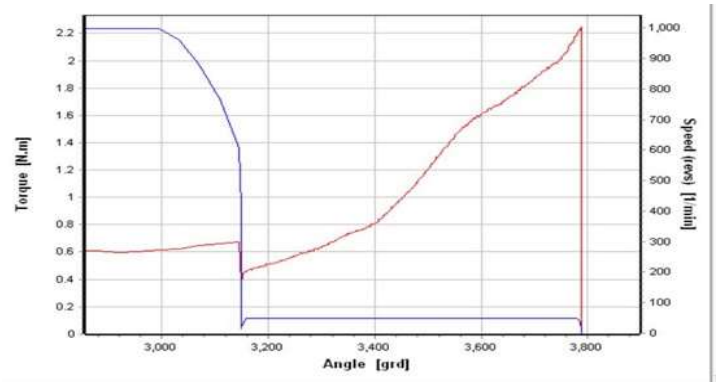
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24	2,24
177705	3000015-05	418,00	354,00	388,00	382,00	397,00	387,00	339,00	410,00	402,00	377,00

Torque graphs

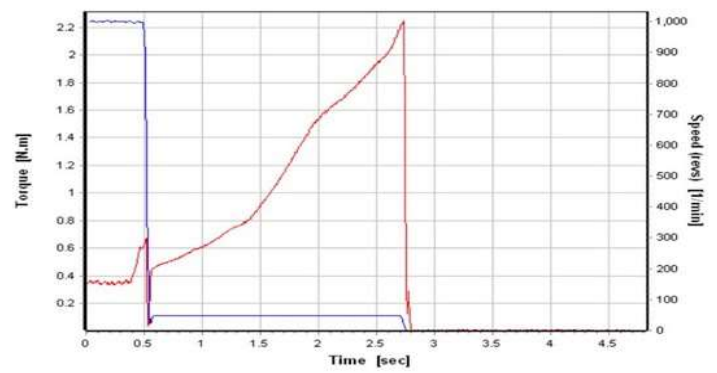
Machine Capability Study 30 %

Model: **CTBPW05Q**
Serial no: **GC0059**

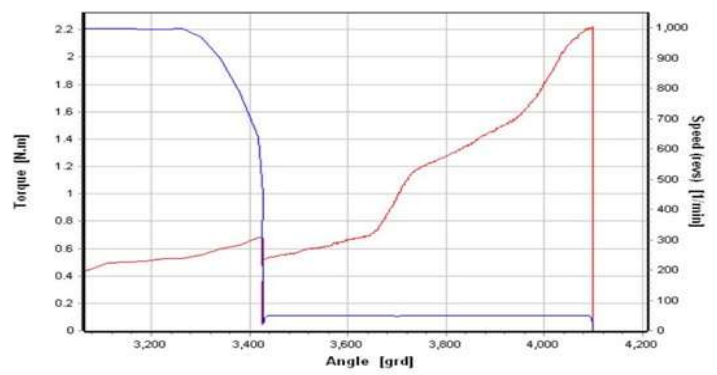
Angle degree: **360°**
Test torque: **2.2 Nm**



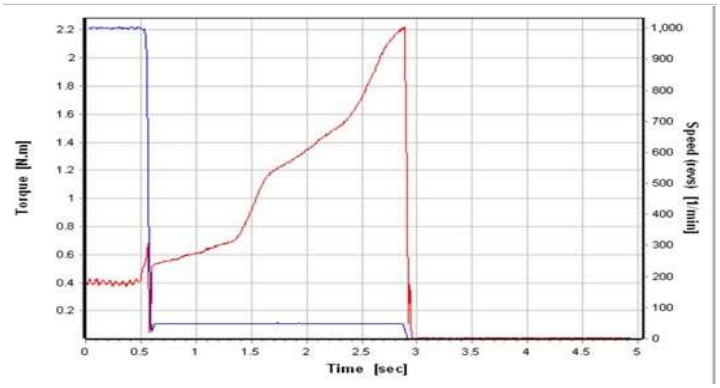
Value no. 1
Graph
Torque / Angle / Speed



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: **GC0059**

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

Hard joint (H)	24.97	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	4.16 Nm	4.12 Nm
	Standard deviation	0.02 Nm	0.01 Nm
	Torque scatter (99,73%)	0.12 Nm	0.07 Nm
	C_m	4.76	7.93
	C_{mk}	4.40	7.30

b) Min. C_m hard/soft (lowest value) 4.76
Min. C_{mk} hard/soft (lowest value) 4.40

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

Note:

Machine Capability Study
Control System

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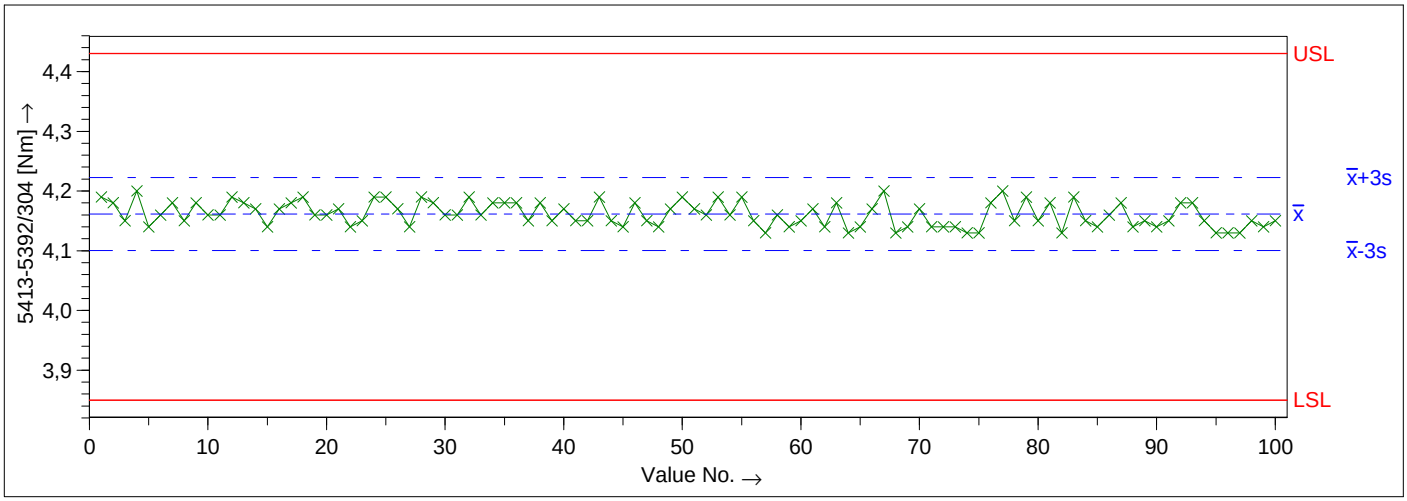
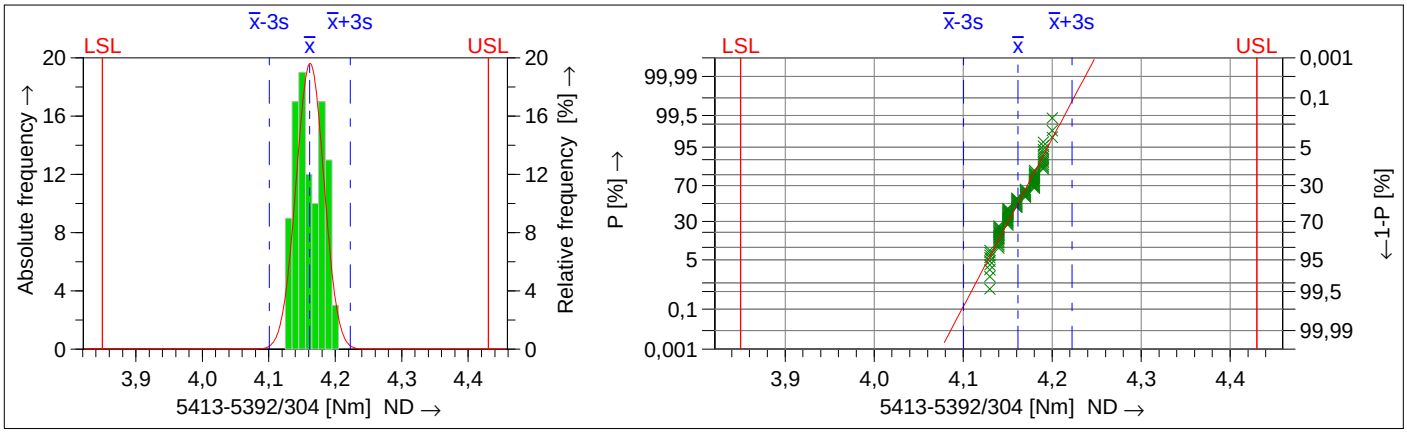
Plant ATG Lexington		Operator Name M. SHERMAN	Date 26.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059h	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 26.03.2021 08:01:59 to 26.03.2021 08:31:36

Rem. TQ 80% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1615
LSL	3.85	x_{min}	4.13	$\bar{x}$-3s	4.1005
USL	4.43	x_{max}	4.20	$\bar{x}$+3s	4.2225
T	0.58	R	0.07	6s	0.1219
		$n_{<T>}$	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	4.76
Critical capability index	=	C_{mk}	4.40

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 26.03.2021

Ser.No.	GC0059h	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: 5.85 Nm; Cur-Cal:0.0384 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	4,19	4,18	4,15	4,20	4,14	4,16	4,18	4,15	4,18	4,16
5376169	5413-5392/304	32,25	31,00	30,50	32,50	30,50	31,00	30,25	30,00	32,50	30,50

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	4,16	4,19	4,18	4,17	4,14	4,17	4,18	4,19	4,16	4,16
5376169	5413-5392/304	32,25	32,50	30,50	32,25	31,00	30,75	29,25	32,00	29,50	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}
5376169	5413-5392/304	4,17	4,14	4,15	4,19	4,19	4,17	4,14	4,19	4,18	4,16
5376169	5413-5392/304	30,00	32,00	29,50	29,75	31,75	29,50	29,75	29,75	31,50	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	4,16	4,19	4,16	4,18	4,18	4,18	4,15	4,18	4,15	4,17
5376169	5413-5392/304	30,00	32,00	29,50	31,75	29,75	29,75	29,25	30,00	29,00	29,25

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	4,15	4,15	4,19	4,15	4,14	4,18	4,15	4,14	4,17	4,19
5376169	5413-5392/304	28,75	29,25	31,25	29,75	29,25	31,00	29,25	29,00	28,75	31,75

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	4,17	4,16	4,19	4,16	4,19	4,15	4,13	4,16	4,14	4,15
5376169	5413-5392/304	29,50	29,75	29,75	29,25	29,25	29,50	29,25	31,50	29,25	29,75

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	4,17	4,14	4,18	4,13	4,14	4,17	4,20	4,13	4,14	4,17
5376169	5413-5392/304	29,50	29,50	29,25	30,00	29,25	31,00	31,75	29,25	29,00	29,50

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	4,14	4,14	4,14	4,13	4,13	4,18	4,20	4,15	4,19	4,15
5376169	5413-5392/304	29,50	29,75	31,25	30,00	30,00	30,25	30,25	29,75	30,50	30,25

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 26.03.2021

Ser.No.	GC0059h	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: 5.85 Nm; Cur-Cal:0.0384 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	4,18	4,13	4,19	4,15	4,14	4,16	4,18	4,14	4,15	4,14
5376169	5413-5392/304	30,25	29,75	30,50	30,75	29,50	30,00	30,75	29,75	31,50	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	4,15	4,18	4,18	4,15	4,13	4,13	4,13	4,15	4,14	4,15
5376169	5413-5392/304	29,50	31,00	30,25	29,75	29,75	30,25	30,00	30,00	30,50	30,75

Machine Capability Study
Tool System

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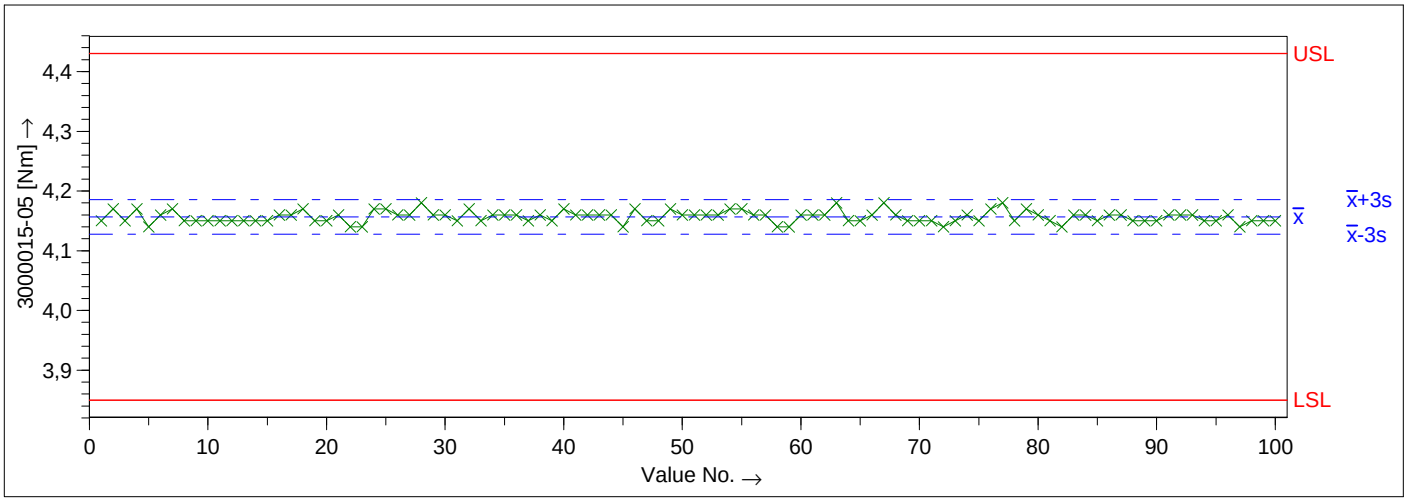
Plant ATG Lexington		Operator Name M. SHERMAN	Date 26.03.2021

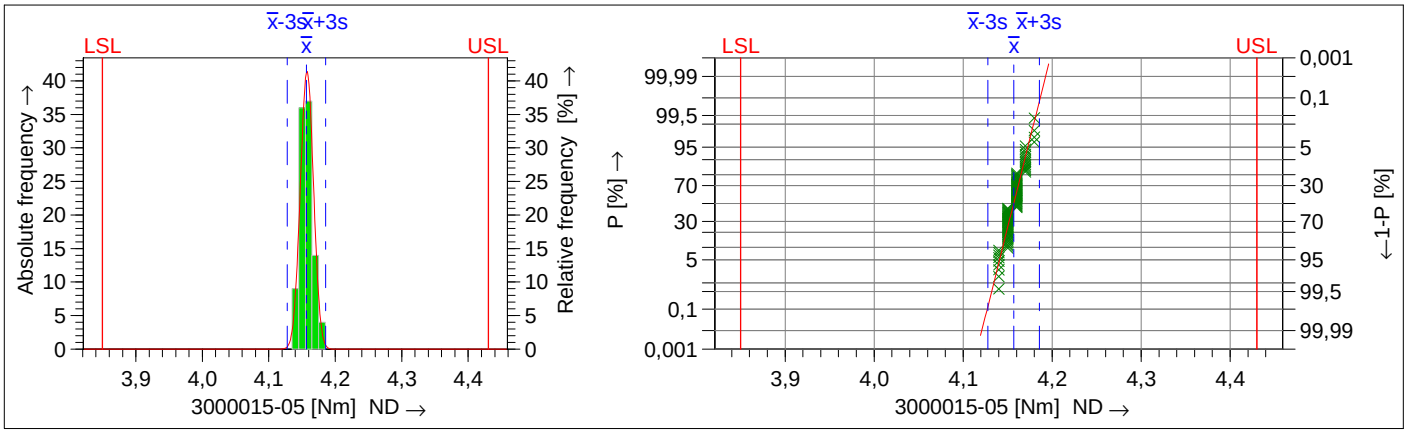
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059h	Char.Descr. 3000015-05	Inspection Val.	4,14	0,29	USL 4,43
	Serial No. 177705	Unit	Nm	-0,29	LSL 3,85
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2

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

Evaluation from 26.03.2021 08:01:58 to 26.03.2021 08:31:35

Rem. TQ 80% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1568
LSL	3.85	x_{min}	4.14	$\bar{x}$-3s	4.1279
USL	4.43	x_{max}	4.18	$\bar{x}$+3s	4.1857
T	0.58	R	0.04	6s	0.0578
		$n_{<T>}$	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	10.04
Critical capability index	=	C_{mk}	9.46

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 26.03.2021

Ser.No.	GC0059h	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	4,15	4,17	4,15	4,17	4,14	4,16	4,17	4,15	4,15	4,15
177705	3000015-05	33,00	31,00	31,00	32,00	31,00	31,00	30,00	30,00	33,00	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}
177705	3000015-05	4,15	4,15	4,15	4,15	4,15	4,16	4,16	4,17	4,15	4,15
177705	3000015-05	32,00	33,00	30,00	32,00	31,00	31,00	29,00	32,00	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}
177705	3000015-05	4,16	4,14	4,14	4,17	4,17	4,16	4,16	4,18	4,16	4,16
177705	3000015-05	30,00	32,00	30,00	30,00	32,00	30,00	30,00	30,00	32,00	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}
177705	3000015-05	4,15	4,17	4,15	4,16	4,16	4,16	4,15	4,16	4,15	4,17
177705	3000015-05	30,00	33,00	30,00	32,00	30,00	30,00	29,00	30,00	29,00	29,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177705	3000015-05	4,16	4,16	4,16	4,16	4,14	4,17	4,15	4,15	4,17	4,16
177705	3000015-05	29,00	30,00	32,00	30,00	29,00	31,00	29,00	29,00	29,00	32,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177705	3000015-05	4,16	4,16	4,16	4,17	4,17	4,16	4,16	4,14	4,14	4,16
177705	3000015-05	30,00	30,00	30,00	30,00	29,00	30,00	29,00	32,00	29,00	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}
177705	3000015-05	4,16	4,16	4,18	4,15	4,15	4,16	4,18	4,16	4,15	4,15
177705	3000015-05	30,00	30,00	29,00	31,00	30,00	31,00	32,00	30,00	29,00	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}
177705	3000015-05	4,15	4,14	4,15	4,16	4,15	4,17	4,18	4,15	4,17	4,16
177705	3000015-05	30,00	30,00	32,00	30,00	30,00	30,00	31,00	30,00	31,00	31,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 26.03.2021

Ser.No.	GC0059h	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	3,85
				USL	4,43
Remark	TQ 80% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	4,15	4,14	4,16	4,16	4,15	4,16	4,16	4,15	4,15	4,15
177705	3000015-05	31,00	30,00	31,00	32,00	30,00	30,00	31,00	30,00	32,00	30,00

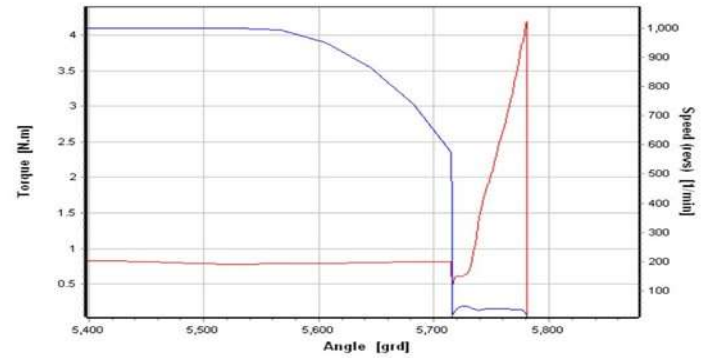
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	4,16	4,16	4,16	4,15	4,15	4,16	4,14	4,15	4,15	4,15
177705	3000015-05	30,00	31,00	31,00	30,00	30,00	30,00	30,00	30,00	30,00	31,00

Torque graphs

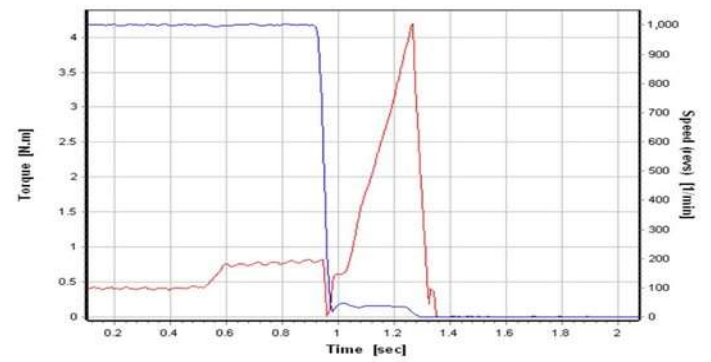
Machine Capability Study 80 %

Model: **CTBPW05Q**
Serial no: **GC0059**

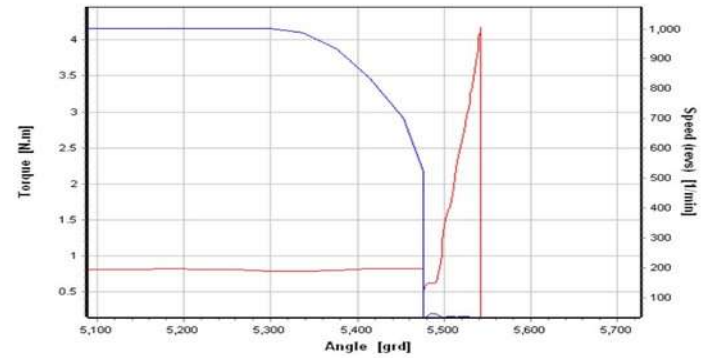
Angle degree: **30°**
Test torque: **4.1 Nm**



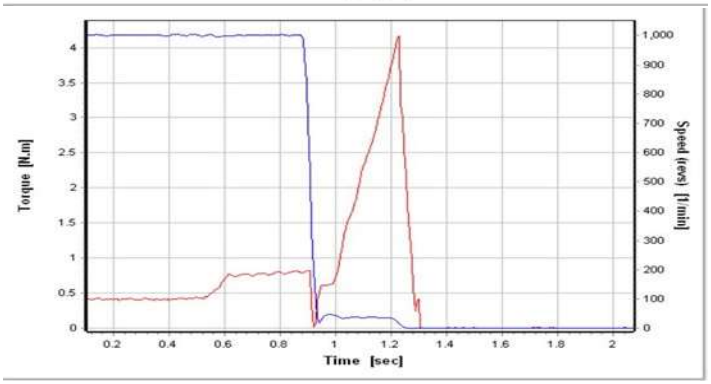
Value no. 1
Graph
Torque / Angle / Speed



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

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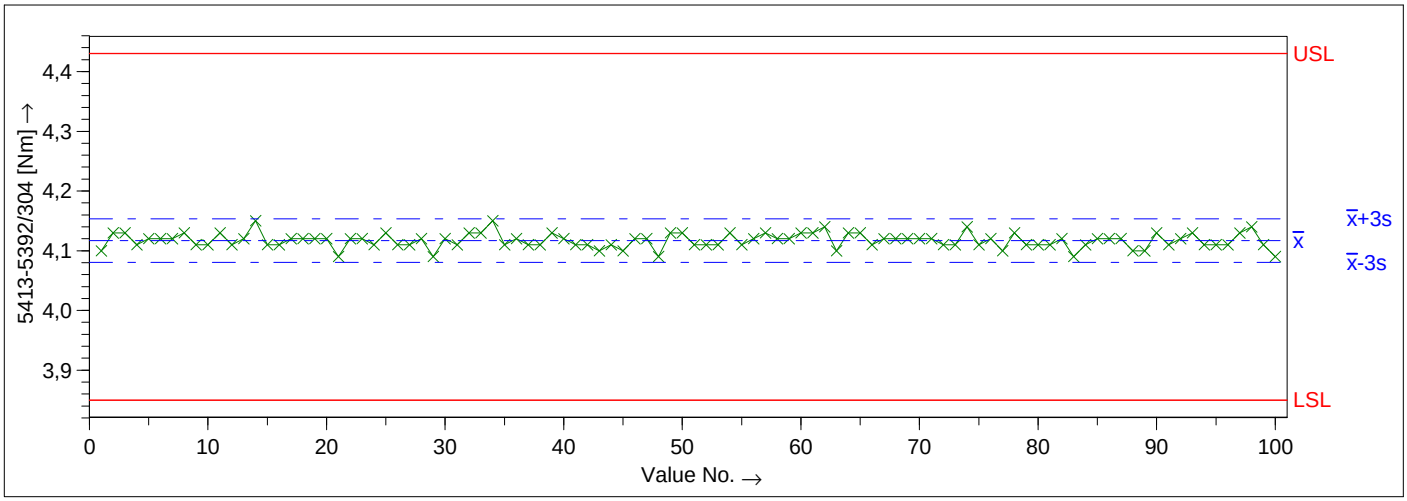
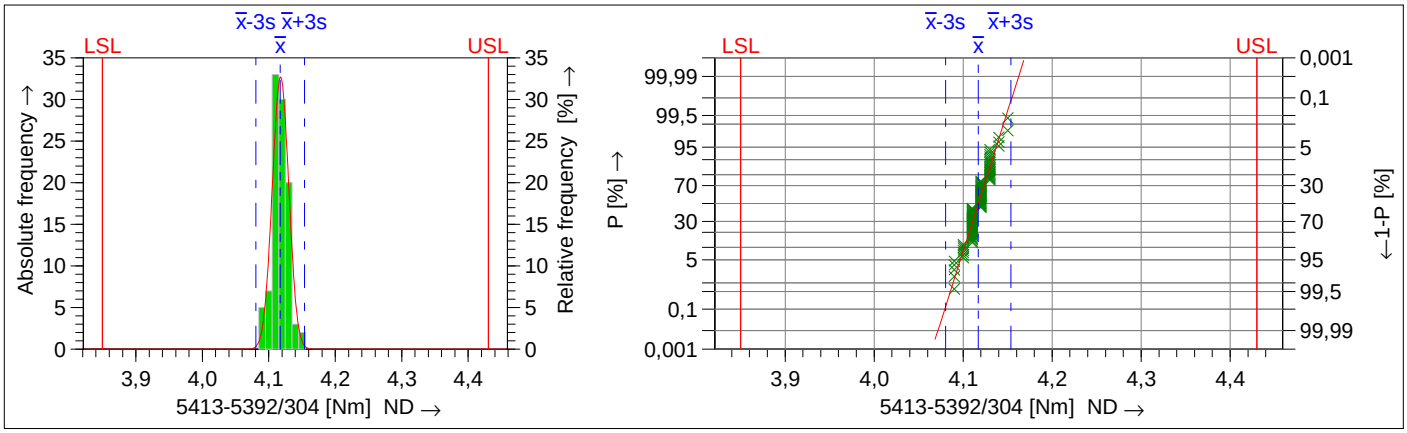
Plant ATG Lexington		Operator Name M. SHERMAN	Date 25.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059g	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 25.03.2021 04:01:41 to 25.03.2021 05:04:23

Rem. TQ 80% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1170
LSL	3.85	x_{min}	4.09	$\bar{x}$-3s	4.0804
USL	4.43	x_{max}	4.15	$\bar{x}$+3s	4.1536
T	0.58	R	0.06	6s	0.0731
		$n_{<T>}$	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	7.93
Critical capability index	=	C_{mk}	7.30

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 25.03.2021

Ser.No.	GC0059g	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: 5.85 Nm; Cur-Cal:0.0384 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	4,10	4,13	4,13	4,11	4,12	4,12	4,12	4,13	4,11	4,11
5376169	5413-5392/304	348,50	369,25	351,50	357,75	353,50	358,75	357,75	372,75	363,50	348,50

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	4,13	4,11	4,12	4,15	4,11	4,11	4,12	4,12	4,12	4,12
5376169	5413-5392/304	363,25	353,50	351,25	354,50	355,00	354,75	357,25	353,50	358,50	359,25

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	4,09	4,12	4,12	4,11	4,13	4,11	4,11	4,12	4,09	4,12
5376169	5413-5392/304	353,00	357,50	357,00	350,75	359,50	368,75	357,25	373,00	348,50	355,50

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	4,11	4,13	4,13	4,15	4,11	4,12	4,11	4,11	4,13	4,12
5376169	5413-5392/304	368,50	366,50	361,25	368,00	353,50	356,00	346,25	371,75	365,25	349,00

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	4,11	4,11	4,10	4,11	4,10	4,12	4,12	4,09	4,13	4,13
5376169	5413-5392/304	347,50	370,00	351,00	375,75	352,25	356,00	358,75	352,00	369,00	364,75

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	4,11	4,11	4,11	4,13	4,11	4,12	4,13	4,12	4,12	4,13
5376169	5413-5392/304	346,00	349,75	351,50	357,25	364,75	359,25	361,75	355,50	357,00	357,25

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	4,13	4,14	4,10	4,13	4,13	4,11	4,12	4,12	4,12	4,12
5376169	5413-5392/304	375,25	379,25	356,75	356,00	351,00	352,00	356,25	378,00	351,75	357,50

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	4,12	4,11	4,11	4,14	4,11	4,12	4,10	4,13	4,11	4,11
5376169	5413-5392/304	352,25	347,25	352,25	366,75	365,25	360,00	353,50	362,75	359,00	375,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059g	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: 5.85 Nm; Cur-Cal:0.0384 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	4,11	4,12	4,09	4,11	4,12	4,12	4,12	4,10	4,10	4,13
5376169	5413-5392/304	372,25	359,50	353,25	360,00	358,25	374,75	370,75	360,75	359,25	361,00

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	4,11	4,12	4,13	4,11	4,11	4,11	4,13	4,14	4,11	4,09
5376169	5413-5392/304	355,75	359,00	368,75	378,75	353,25	366,50	359,25	359,50	366,75	366,25

Machine Capability Study
Tool System

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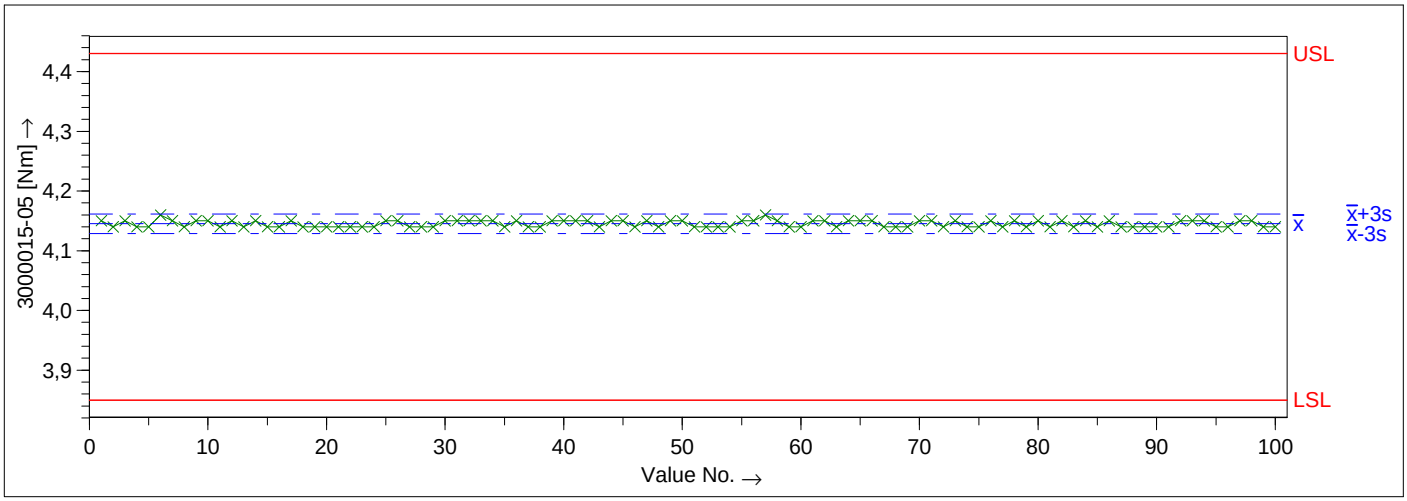
Plant ATG Lexington		Operator Name M. SHERMAN	Date 25.03.2021

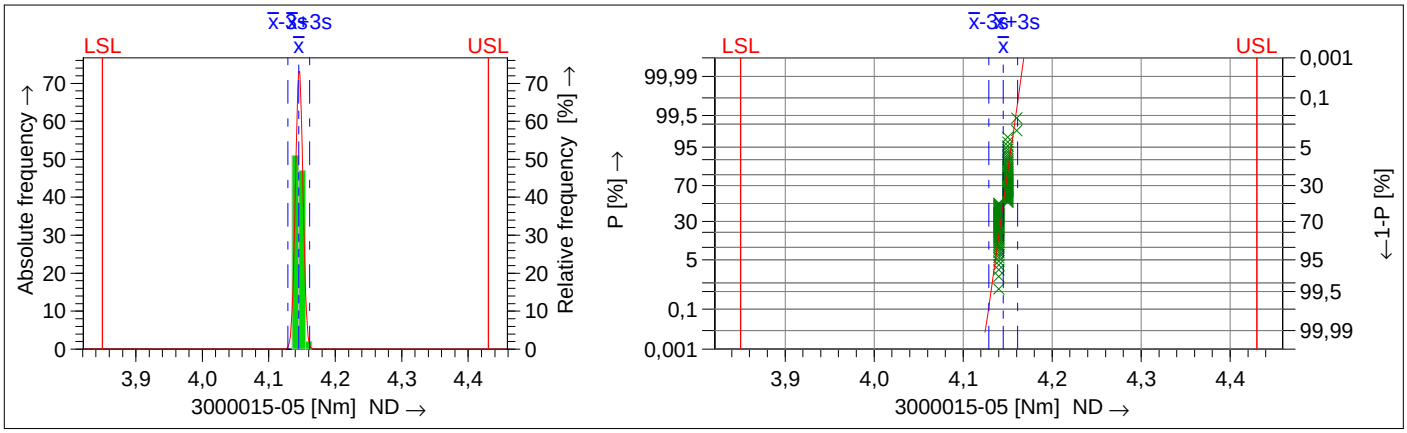
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059g	Char.Descr. 3000015-05	Inspection Val.	4,14	0,29	USL 4,43
	Serial No. 177705	Unit	Nm	-0,29	LSL 3,85
Char.Type variable		Tolerance value	7 %		Decimal Pl. 2

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

Evaluation from 25.03.2021 16:01:43 to 25.03.2021 17:04:22

Rem. TQ 80% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.14			$\bar{x}$	4.1451
LSL	3.85	x_{min}	4.14	$\bar{x}$-3s	4.1289
USL	4.43	x_{max}	4.16	$\bar{x}$+3s	4.1613
T	0.58	R	0.02	6s	0.0325
		$n_{<T>}$	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	17.86
Critical capability index	=	C_{mk}	17.55

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 25.03.2021

Ser.No.	GC0059g	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	4,15	4,14	4,15	4,14	4,14	4,16	4,15	4,14	4,15	4,15
177705	3000015-05	353,00	372,00	353,00	359,00	356,00	360,00	360,00	374,00	367,00	355,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177705	3000015-05	4,14	4,15	4,14	4,15	4,14	4,14	4,15	4,14	4,14	4,14
177705	3000015-05	366,00	355,00	353,00	361,00	360,00	356,00	359,00	355,00	362,00	366,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177705	3000015-05	4,14	4,14	4,14	4,14	4,15	4,15	4,14	4,14	4,14	4,15
177705	3000015-05	361,00	360,00	360,00	356,00	360,00	376,00	363,00	374,00	354,00	367,00

Char.No	Char.Descr.	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	x_{37}	x_{38}	x_{39}	x_{40}
177705	3000015-05	4,15	4,15	4,15	4,15	4,14	4,15	4,14	4,14	4,15	4,15
177705	3000015-05	376,00	367,00	366,00	375,00	354,00	359,00	350,00	380,00	375,00	359,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177705	3000015-05	4,15	4,15	4,14	4,15	4,15	4,14	4,15	4,14	4,15	4,15
177705	3000015-05	353,00	376,00	354,00	378,00	361,00	363,00	362,00	360,00	374,00	379,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177705	3000015-05	4,14	4,14	4,14	4,14	4,15	4,15	4,16	4,15	4,14	4,14
177705	3000015-05	353,00	358,00	354,00	360,00	374,00	367,00	362,00	360,00	360,00	362,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177705	3000015-05	4,15	4,15	4,14	4,15	4,15	4,15	4,14	4,14	4,14	4,15
177705	3000015-05	375,00	381,00	366,00	360,00	353,00	366,00	360,00	381,00	359,00	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}
177705	3000015-05	4,15	4,14	4,15	4,14	4,14	4,15	4,14	4,15	4,14	4,15
177705	3000015-05	353,00	350,00	360,00	372,00	372,00	366,00	359,00	362,00	366,00	382,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	DATE 25.03.2021

Ser.No.	GC0059g	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,14
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	3,85
				USL	4,43
Remark	TQ 80% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal:0.0384 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}
177705	3000015-05	4,14	4,15	4,14	4,15	4,14	4,15	4,14	4,14	4,14	4,14
177705	3000015-05	380,00	367,00	361,00	363,00	361,00	380,00	378,00	368,00	364,00	365,00

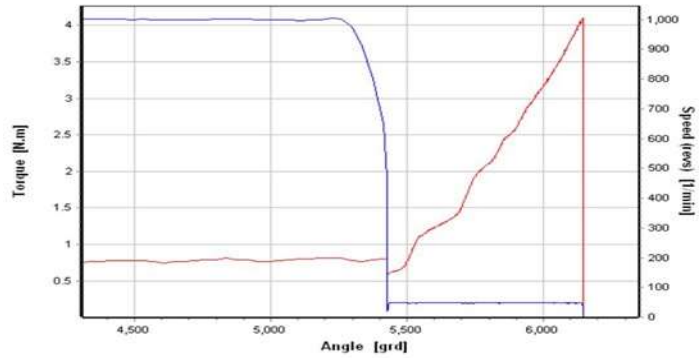
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	4,14	4,15	4,15	4,15	4,14	4,14	4,15	4,15	4,14	4,14
177705	3000015-05	360,00	360,00	376,00	388,00	360,00	374,00	360,00	367,00	367,00	376,00

Torque graphs

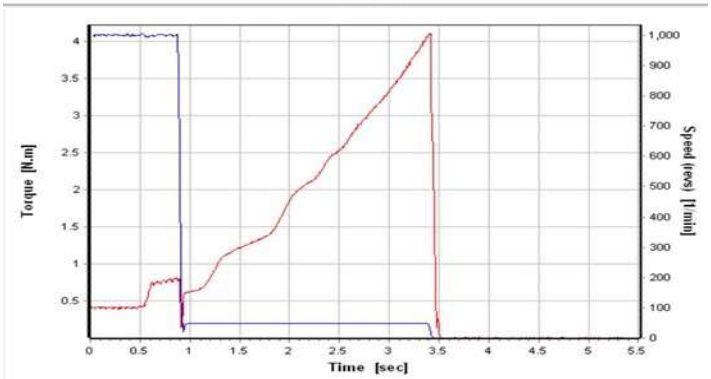
Machine Capability Study 80 %

Model: **CTBPW05Q**
Serial no: **GC0059**

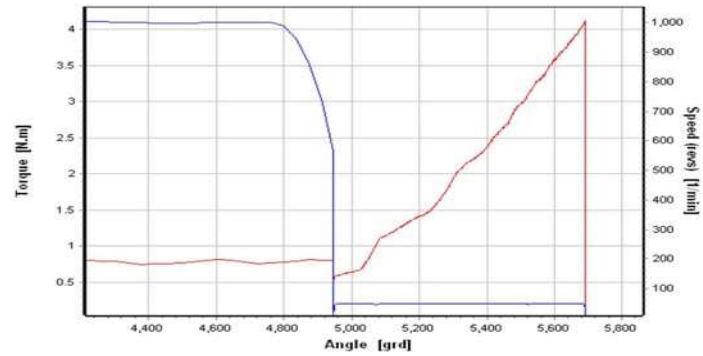
Angle degree: **360°**
Test torque: **4.1 Nm**



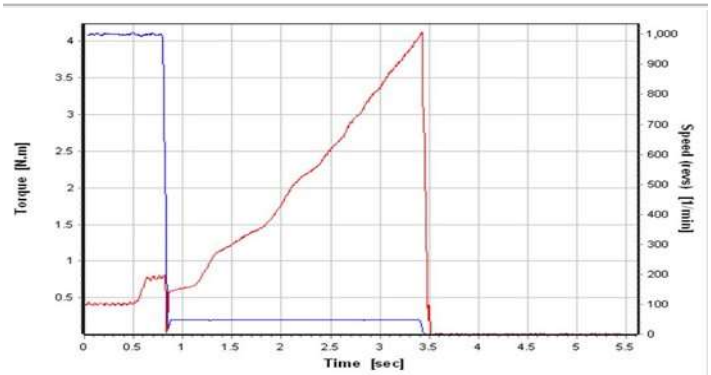
Value no. 1
Graph
Torque / Angle / Speed



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: **GC0059**

Test torque: Tq max. 4.90 Nm

Hard joint (H)	29.47 Nm / Revolution	Angle degree	30°
Soft joint (L)	2.43 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	4.91 Nm	4.87 Nm
	Standard deviation	0.02 Nm	0.01 Nm
	Torque scatter (99,73%)	0.15 Nm	0.09 Nm
	C_m	4.64	7.56
	C_{mk}	4.47	6.82

b) Min. C_m hard/soft (lowest value) 4.64
Min. C_{mk} hard/soft (lowest value) 4.47

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

Note:

Machine Capability Study
Control System

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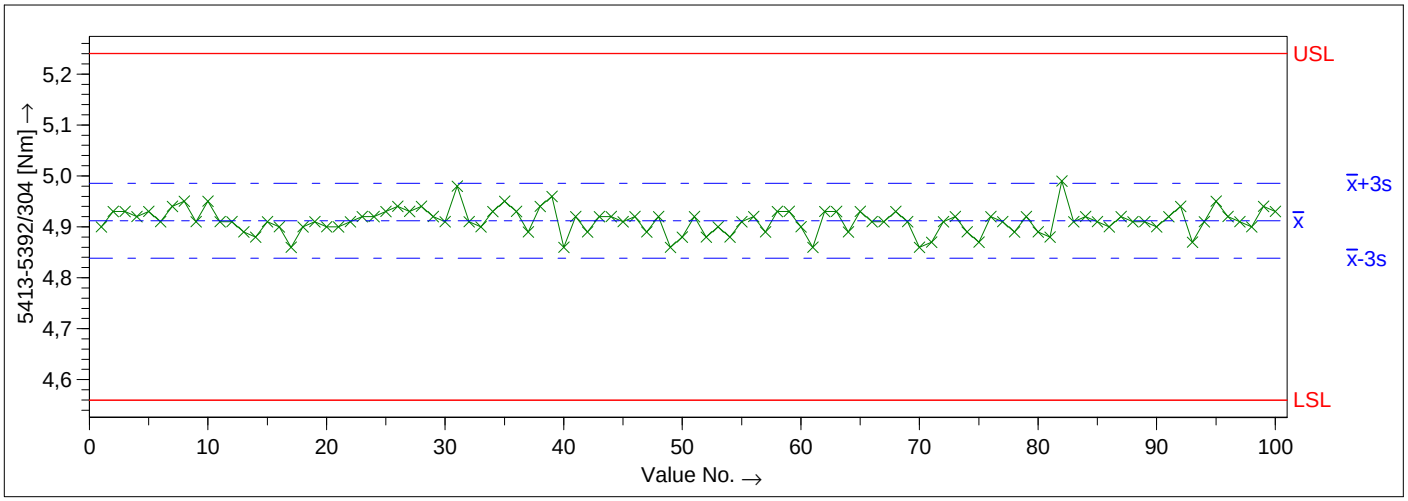
Plant ATG Lexington		Operator Name M. SHERMAN	Date 26.03.2021

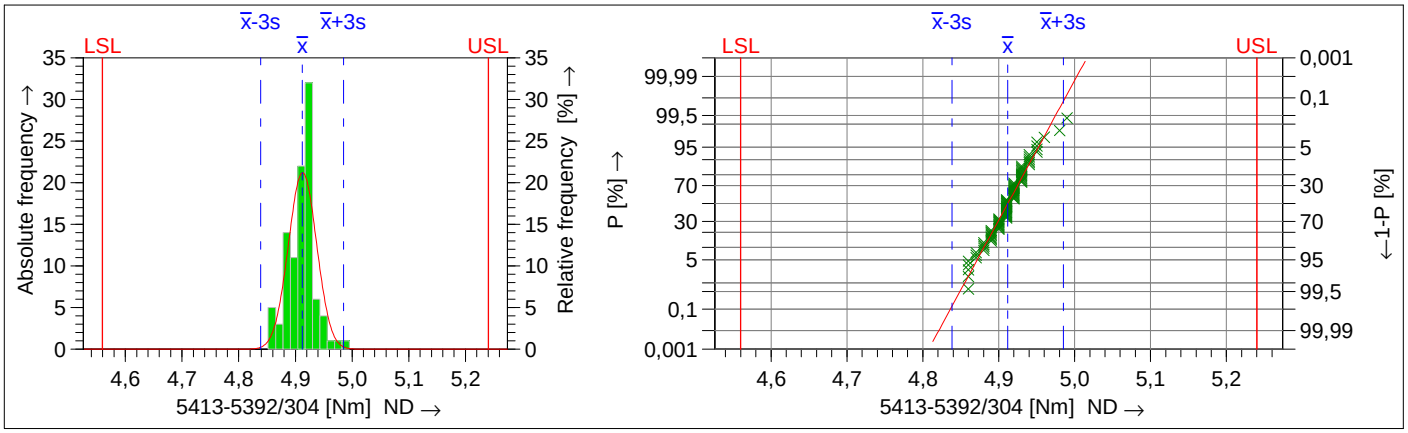
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059b	Char.Descr. 5413-5392/304	Inspection Val. 4,90	0,34	USL 5,24	
	Serial No. 5376169	Unit Nm	-0,34	LSL 4,56	
Char.Type variable		Tolerance value 7 %		Decimal Pl. 2	

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

Evaluation from 26.03.2021 10:30:33 to 26.03.2021 11:00:15

Rem. TQ 100% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9119
LSL	4.56	x_{min}	4.86	$\bar{x}$-3s	4.8386
USL	5.24	x_{max}	4.99	$\bar{x}$+3s	4.9852
T	0.68	R	0.13	6s	0.1466
		$n_{<T>}$	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	4.64
Critical capability index	=	C_{mk}	4.47

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 26.03.2021

Ser.No.	GC0059b	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: 5.85 Nm; Cur-Cal: 0.0384 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	4,93	4,93	4,92	4,93	4,91	4,94	4,95	4,91	4,95
5376169	5413-5392/304	30,25	30,00	29,50	30,00	29,75	30,00	32,50	29,75	30,25	29,50

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	4,91	4,91	4,89	4,88	4,91	4,90	4,86	4,90	4,91	4,90
5376169	5413-5392/304	30,25	30,00	30,75	29,50	29,25	29,50	30,00	30,25	30,50	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}
5376169	5413-5392/304	4,90	4,91	4,92	4,92	4,93	4,94	4,93	4,94	4,92	4,91
5376169	5413-5392/304	30,00	30,50	29,75	30,00	31,00	30,00	31,25	31,50	30,00	30,25

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	4,98	4,91	4,90	4,93	4,95	4,93	4,89	4,94	4,96	4,86
5376169	5413-5392/304	30,25	29,50	29,50	30,50	31,00	29,75	29,75	30,50	30,25	29,50

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	4,92	4,89	4,92	4,92	4,91	4,92	4,89	4,92	4,86	4,88
5376169	5413-5392/304	29,25	29,75	30,00	29,50	30,00	29,50	29,75	31,00	29,25	29,50

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	4,92	4,88	4,90	4,88	4,91	4,92	4,89	4,93	4,93	4,90
5376169	5413-5392/304	29,75	29,50	30,00	30,50	29,75	30,00	30,25	30,00	30,50	30,25

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	4,86	4,93	4,93	4,89	4,93	4,91	4,91	4,93	4,91	4,86
5376169	5413-5392/304	29,50	30,75	30,50	29,75	30,25	30,25	29,50	29,75	30,50	29,50

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	4,87	4,91	4,92	4,89	4,87	4,92	4,91	4,89	4,92	4,89
5376169	5413-5392/304	29,75	30,50	30,00	29,75	29,25	30,25	29,50	30,00	30,00	30,00

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 26.03.2021

Ser.No.	GC0059b	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: 5.85 Nm; Cur-Cal: 0.0384 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	4,99	4,91	4,92	4,91	4,90	4,92	4,91	4,91	4,90
5376169	5413-5392/304	29,75	30,50	29,25	30,25	30,25	30,25	30,00	30,25	29,75	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	4,92	4,94	4,87	4,91	4,95	4,92	4,91	4,90	4,94	4,93
5376169	5413-5392/304	29,75	29,75	29,50	30,25	30,00	30,00	30,00	30,00	30,00	30,50

Machine Capability Study
Tool System

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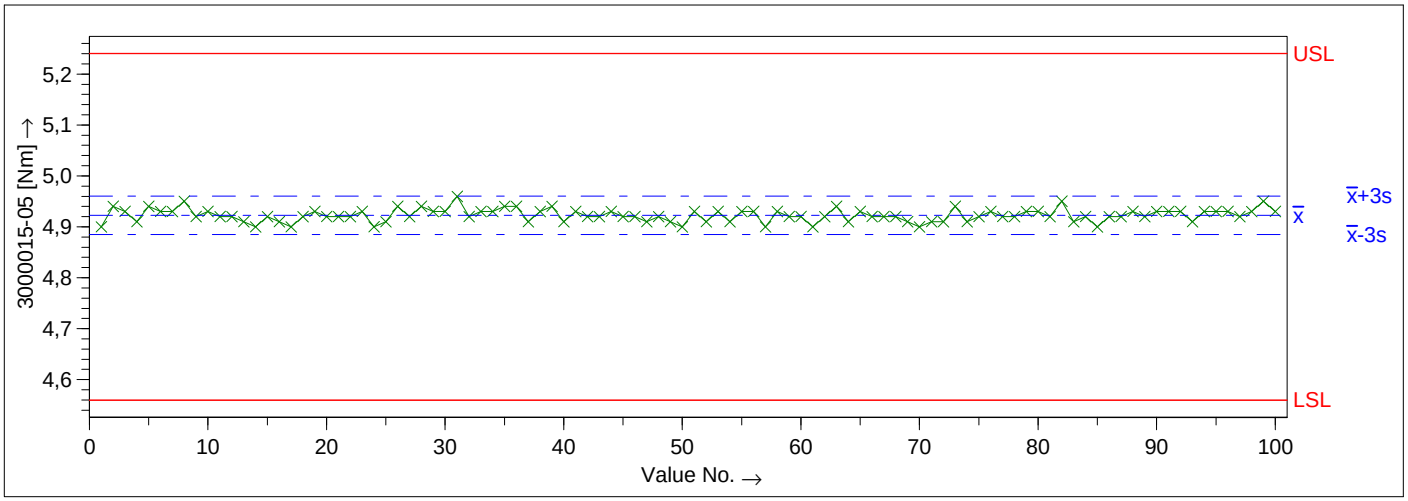
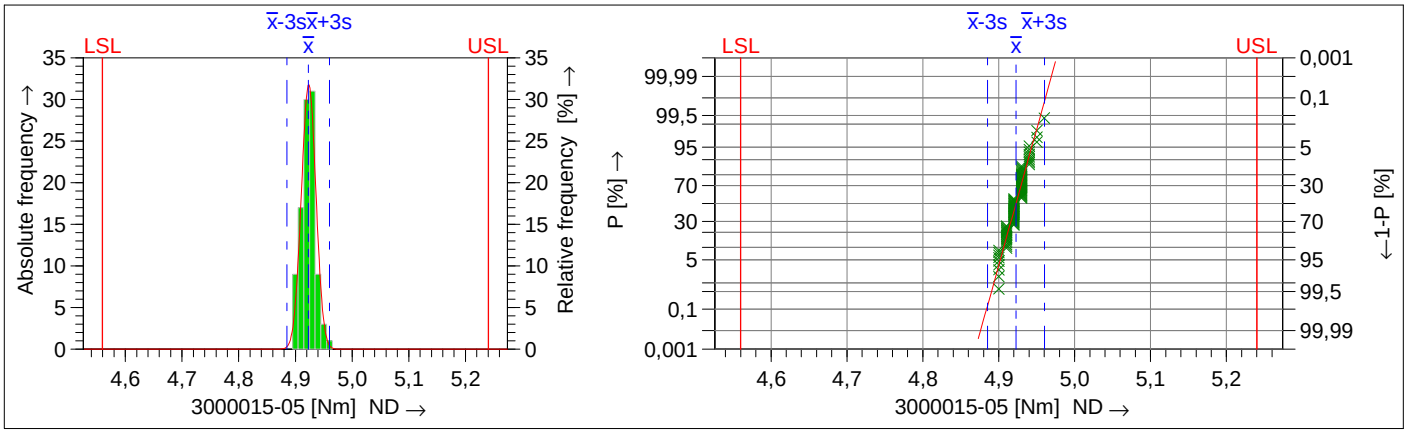
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	26.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0059b	Char.Descr.	3000015-05	Inspection Val. 4,90 0,34	USL 5,24
		Serial No.	177705	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 26.03.2021 10:30:32 to 26.03.2021 11:00:14

Rem. TQ 100% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9227
LSL	4.56	x_{min}	4.90	$\bar{x}$-3s	4.8851
USL	5.24	x_{max}	4.96	$\bar{x}$+3s	4.9603
T	0.68	R	0.06	6s	0.0752
		$n_{<T>}$	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	9.04
Critical capability index	=	C_{mk}	8.43

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 26.03.2021

Ser.No.	GC0059b	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 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}
177705	3000015-05	4,90	4,94	4,93	4,91	4,94	4,93	4,93	4,95	4,92	4,93
177705	3000015-05	31,00	31,00	30,00	31,00	30,00	31,00	33,00	30,00	31,00	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}
177705	3000015-05	4,92	4,92	4,91	4,90	4,92	4,91	4,90	4,92	4,93	4,92
177705	3000015-05	31,00	31,00	31,00	30,00	30,00	30,00	31,00	31,00	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}
177705	3000015-05	4,92	4,92	4,93	4,90	4,91	4,94	4,92	4,94	4,93	4,93
177705	3000015-05	30,00	31,00	31,00	31,00	32,00	30,00	32,00	33,00	30,00	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}
177705	3000015-05	4,96	4,92	4,93	4,93	4,94	4,94	4,91	4,93	4,94	4,91
177705	3000015-05	31,00	30,00	30,00	31,00	31,00	30,00	31,00	31,00	31,00	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}
177705	3000015-05	4,93	4,92	4,92	4,93	4,92	4,92	4,91	4,92	4,91	4,90
177705	3000015-05	30,00	31,00	31,00	30,00	30,00	30,00	30,00	32,00	30,00	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}
177705	3000015-05	4,93	4,91	4,93	4,91	4,93	4,93	4,90	4,93	4,92	4,92
177705	3000015-05	30,00	30,00	31,00	31,00	31,00	30,00	31,00	31,00	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}
177705	3000015-05	4,90	4,92	4,94	4,91	4,93	4,92	4,92	4,92	4,91	4,90
177705	3000015-05	30,00	31,00	31,00	30,00	31,00	31,00	30,00	30,00	31,00	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}
177705	3000015-05	4,91	4,91	4,94	4,91	4,92	4,93	4,92	4,92	4,93	4,93
177705	3000015-05	31,00	32,00	30,00	30,00	30,00	31,00	31,00	31,00	31,00	31,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 26.03.2021

Ser.No.	GC0059b	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	4,56
				USL	5,24
Remark	TQ 100% hard +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 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}
177705	3000015-05	4,92	4,95	4,91	4,92	4,90	4,92	4,92	4,93	4,92	4,93
177705	3000015-05	30,00	31,00	30,00	31,00	31,00	31,00	31,00	31,00	31,00	31,00

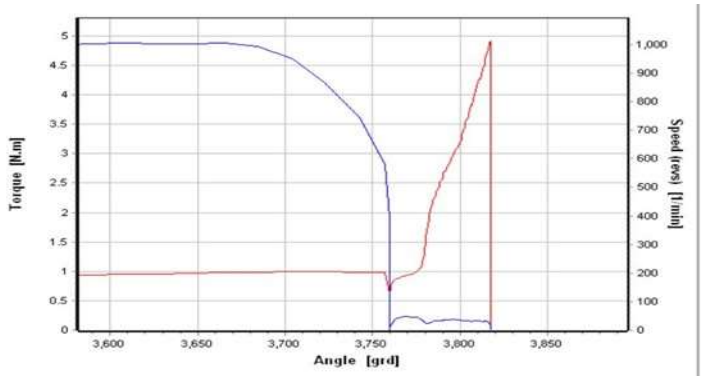
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	4,93	4,93	4,91	4,93	4,93	4,93	4,92	4,93	4,95	4,93
177705	3000015-05	31,00	30,00	30,00	31,00	31,00	31,00	30,00	31,00	30,00	31,00

Torque graphs

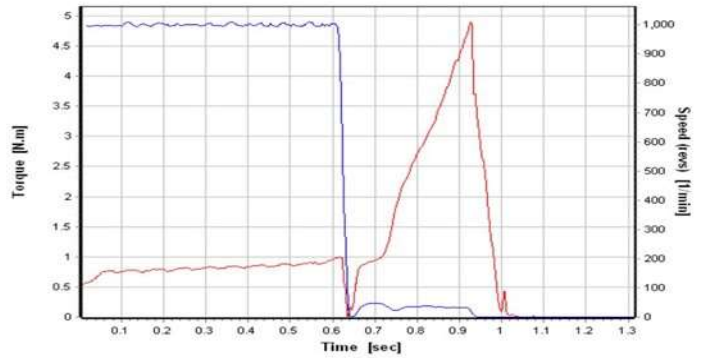
Machine Capability Study 100 %

Model: **CTBPW05Q**
Serial no: **GC0059**

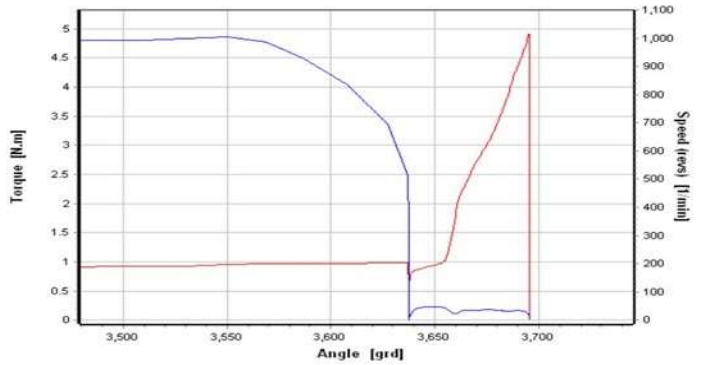
Angle degree: **30°**
Test torque: **4.9 Nm**



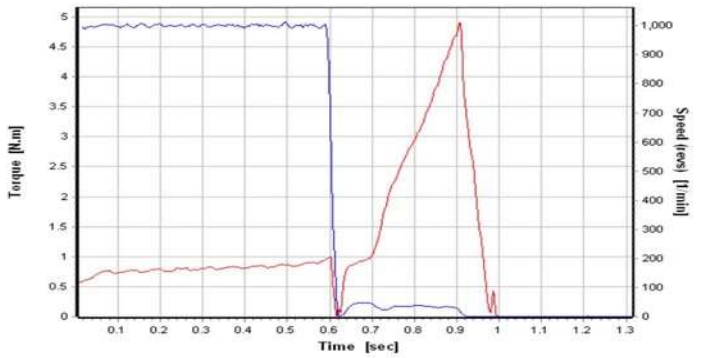
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed

Machine Capability Study
Control System

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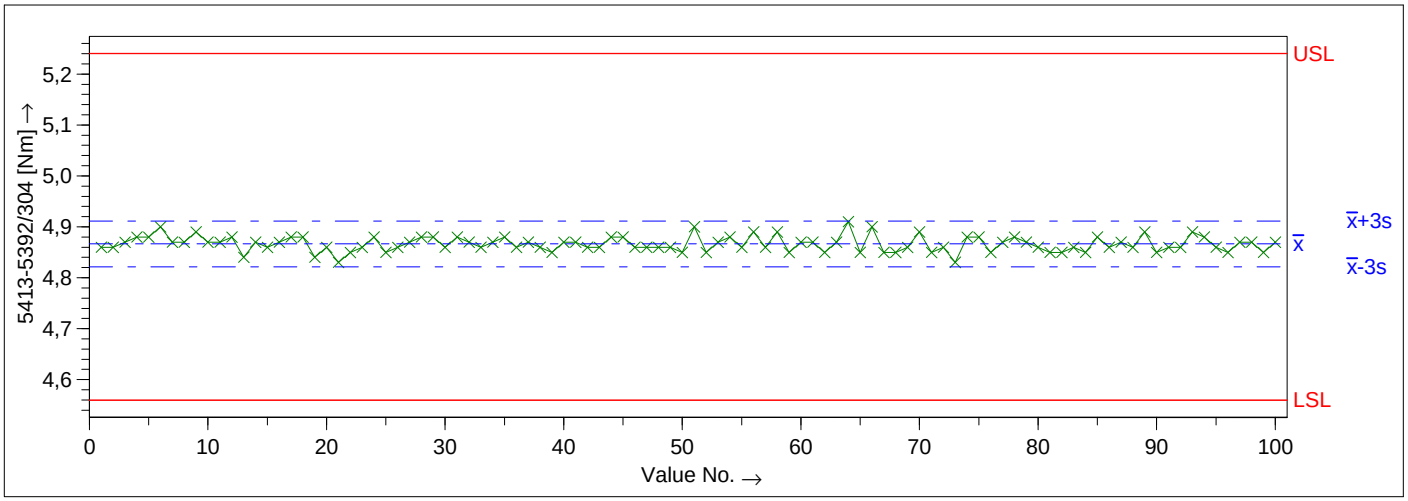
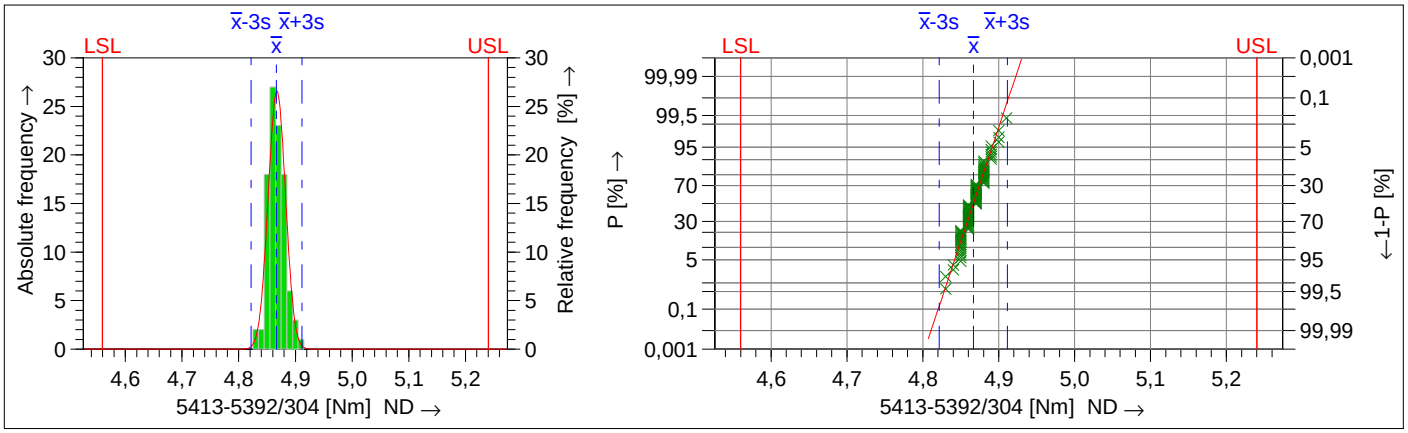
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	26.03.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q	Contr.item	yes
Serial No.	GC0059a	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 26.03.2021 08:52:45 to 26.03.2021 10:20:11

Rem. TQ 100% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			x̄	4.8666
LSL	4.56	x_{min}	4.83	x̄-3s	4.8216
USL	5.24	x_{max}	4.91	x̄+3s	4.9116
T	0.68	R	0.08	6s	0.0899
		$n_{<T>}$	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	7.56
Critical capability index	=	C_{mk}	6.82

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 26.03.2021

Ser.No.	GC0059a	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: 5.85 Nm; Cur-Cal: 0.0384 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	4,86	4,86	4,87	4,88	4,88	4,90	4,87	4,87	4,89	4,87
5376169	5413-5392/304	353,25	360,50	362,25	357,00	360,25	363,00	350,00	359,75	360,50	358,50

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	4,87	4,88	4,84	4,87	4,86	4,87	4,88	4,88	4,84	4,86
5376169	5413-5392/304	354,75	360,00	355,25	362,00	361,50	361,50	360,75	360,50	361,50	355,25

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	4,83	4,85	4,86	4,88	4,85	4,86	4,87	4,88	4,88	4,86
5376169	5413-5392/304	357,50	358,50	358,25	360,00	356,50	353,75	359,75	364,00	360,00	362,25

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	4,88	4,87	4,86	4,87	4,88	4,86	4,87	4,86	4,85	4,87
5376169	5413-5392/304	359,00	356,00	355,25	357,50	358,50	360,75	362,25	352,75	353,00	359,00

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	4,87	4,86	4,86	4,88	4,88	4,86	4,86	4,86	4,86	4,85
5376169	5413-5392/304	358,00	358,00	355,75	359,00	359,00	359,00	360,75	362,25	358,25	354,50

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	4,90	4,85	4,87	4,88	4,86	4,89	4,86	4,89	4,85	4,87
5376169	5413-5392/304	365,75	361,25	359,50	361,00	355,00	361,00	362,75	360,25	359,25	363,00

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	4,87	4,85	4,87	4,91	4,85	4,90	4,85	4,85	4,86	4,89
5376169	5413-5392/304	354,00	361,25	363,25	358,25	358,50	357,75	354,50	360,75	361,25	357,50

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	4,85	4,86	4,83	4,88	4,88	4,85	4,87	4,88	4,87	4,86
5376169	5413-5392/304	359,25	357,50	358,50	364,50	360,75	359,75	353,75	357,75	360,00	355,00

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 26.03.2021

Ser.No.	GC0059a	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: 5.85 Nm; Cur-Cal: 0.0384 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	4,85	4,85	4,86	4,85	4,88	4,86	4,87	4,86	4,89	4,85
5376169	5413-5392/304	361,50	360,25	359,00	361,00	352,50	354,75	356,25	358,50	359,50	354,25

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	4,86	4,86	4,89	4,88	4,86	4,85	4,87	4,87	4,85	4,87
5376169	5413-5392/304	361,25	350,25	358,75	363,50	359,75	364,50	350,00	352,50	356,00	352,50

Machine Capability Study
Tool System

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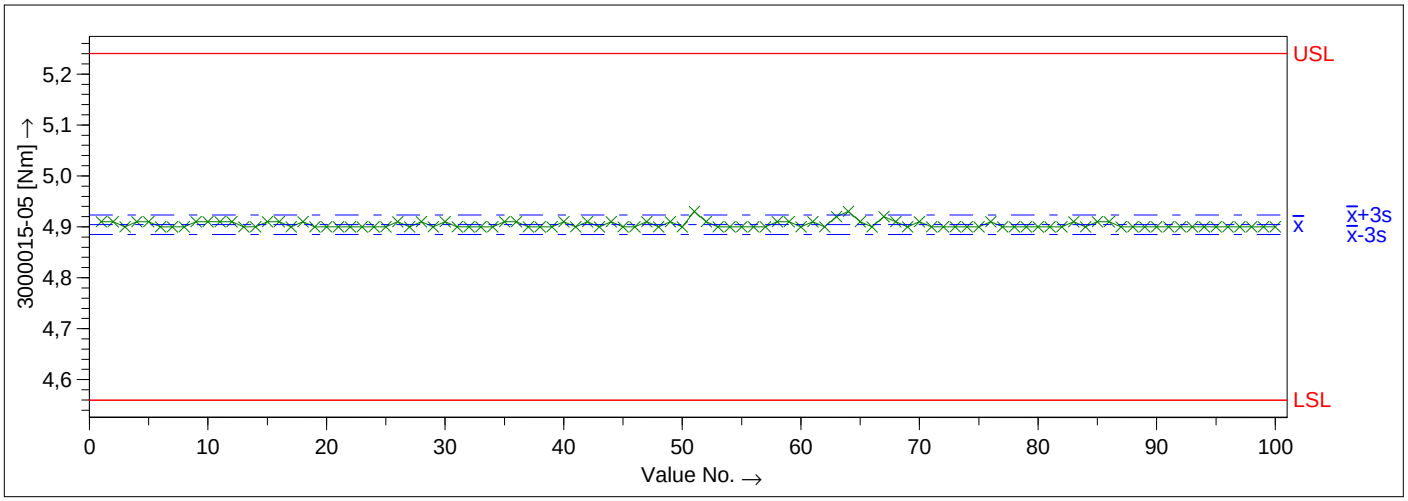
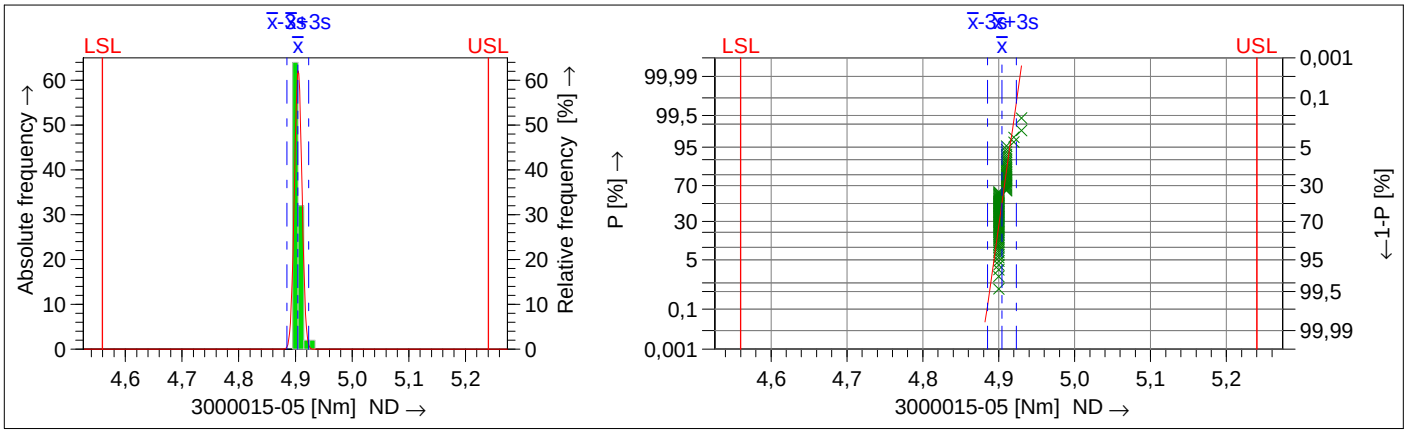
Plant ATG Lexington		Operator Name M. SHERMAN	Date 26.03.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059a	Char.Descr. 3000015-05	Inspection Val.	4,90	0,34	USL 5,24
	Serial No. 177705	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 26.03.2021 08:52:44 to 26.03.2021 10:20:11

Rem. TQ 100% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 1000-50 RPM;





Drawing Values		Collected Values		Statistics	
T_m	4.90			$\bar{x}$	4.9042
LSL	4.56	x_{min}	4.90	$\bar{x}$-3s	4.8850
USL	5.24	x_{max}	4.93	$\bar{x}$+3s	4.9234
T	0.68	R	0.03	6s	0.0383
		$n_{<T>}$	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	17.75
Critical capability index	=	C_{mk}	17.53

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 26.03.2021

Ser.No.	GC0059a	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 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}
177705	3000015-05	4,91	4,91	4,90	4,91	4,91	4,90	4,90	4,90	4,91	4,91
177705	3000015-05	360,00	362,00	365,00	360,00	366,00	365,00	352,00	364,00	361,00	361,00

Char.No	Char.Descr.	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	x_{17}	x_{18}	x_{19}	x_{20}
177705	3000015-05	4,91	4,91	4,90	4,90	4,91	4,91	4,90	4,91	4,90	4,90
177705	3000015-05	360,00	371,00	359,00	366,00	368,00	366,00	366,00	372,00	363,00	365,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
177705	3000015-05	4,90	4,90	4,90	4,90	4,90	4,91	4,90	4,91	4,90	4,91
177705	3000015-05	362,00	362,00	366,00	365,00	360,00	361,00	364,00	369,00	362,00	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}
177705	3000015-05	4,90	4,90	4,90	4,90	4,91	4,91	4,90	4,90	4,90	4,91
177705	3000015-05	363,00	359,00	361,00	365,00	362,00	367,00	366,00	361,00	362,00	361,00

Char.No	Char.Descr.	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	x_{47}	x_{48}	x_{49}	x_{50}
177705	3000015-05	4,90	4,91	4,90	4,91	4,90	4,90	4,91	4,90	4,91	4,90
177705	3000015-05	367,00	367,00	368,00	367,00	363,00	362,00	367,00	367,00	368,00	366,00

Char.No	Char.Descr.	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	x_{57}	x_{58}	x_{59}	x_{60}
177705	3000015-05	4,93	4,91	4,90	4,90	4,90	4,90	4,90	4,91	4,91	4,90
177705	3000015-05	367,00	366,00	365,00	365,00	362,00	366,00	369,00	366,00	362,00	365,00

Char.No	Char.Descr.	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	x_{67}	x_{68}	x_{69}	x_{70}
177705	3000015-05	4,91	4,90	4,92	4,93	4,91	4,90	4,92	4,91	4,90	4,91
177705	3000015-05	358,00	365,00	367,00	360,00	368,00	359,00	361,00	363,00	368,00	364,00

Char.No	Char.Descr.	x_{71}	x_{72}	x_{73}	x_{74}	x_{75}	x_{76}	x_{77}	x_{78}	x_{79}	x_{80}
177705	3000015-05	4,90	4,90	4,90	4,90	4,90	4,91	4,90	4,90	4,90	4,90
177705	3000015-05	363,00	365,00	364,00	368,00	367,00	369,00	358,00	363,00	365,00	365,00

Machine Capability Study
Tool System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 26.03.2021

Ser.No.	GC0059a	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	4,90
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	4,56
				USL	5,24
Remark	TQ 100% soft +/-7% * TQ-Cal: 5.85 Nm; Cur-Cal: 0.0384 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}
177705	3000015-05	4,90	4,90	4,91	4,90	4,91	4,91	4,90	4,90	4,90	4,90
177705	3000015-05	368,00	367,00	361,00	366,00	361,00	362,00	363,00	366,00	365,00	356,00

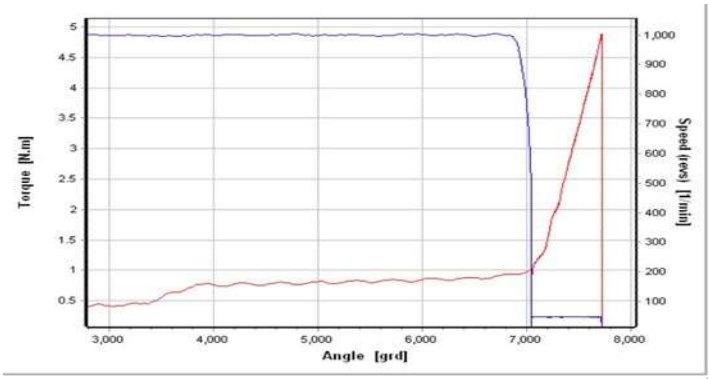
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	4,90	4,90	4,90	4,90	4,90	4,90	4,90	4,90	4,90	4,90
177705	3000015-05	364,00	356,00	365,00	366,00	367,00	367,00	360,00	361,00	361,00	360,00

Torque graphs

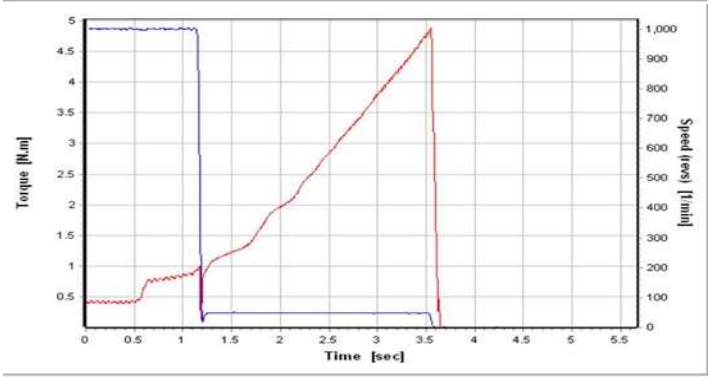
Machine Capability Study 100 %

Model: **CTBPW05Q**
Serial no: **GC0059**

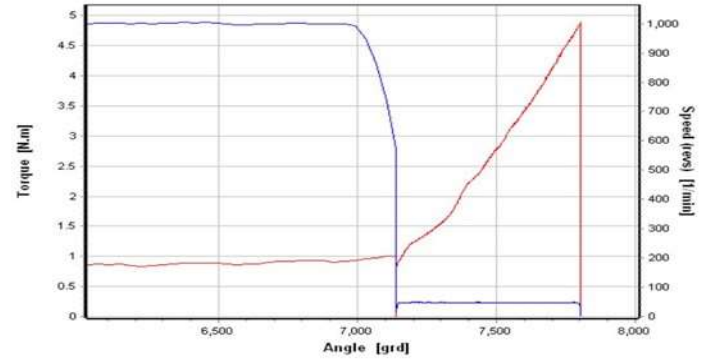
Angle degree: **360°**
Test torque: **4.9 Nm**



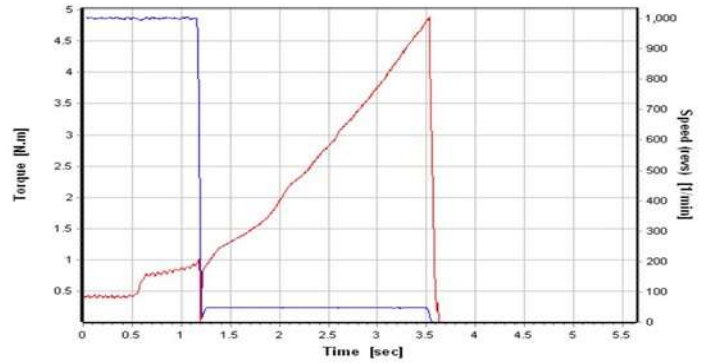
Value no. 1
Graph
Torque / Angle / Speed



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:** GC0059

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: 5.18 % ± **2.59 %**

Angle degree: 40° Tolerance: 2.5° ± **1.2°**

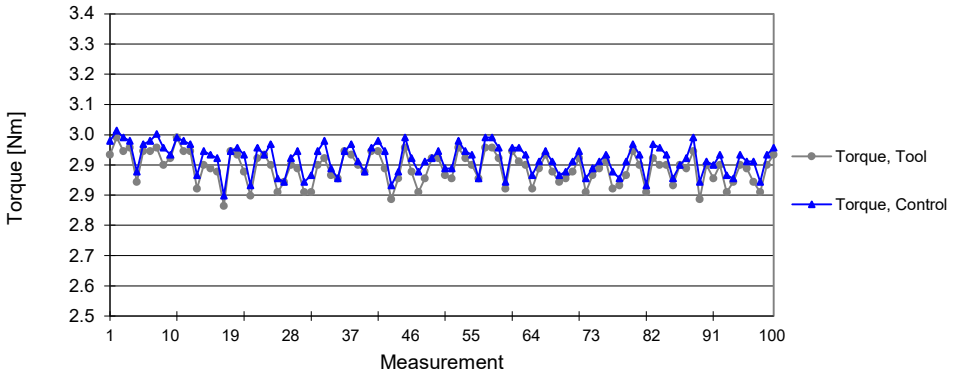
Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

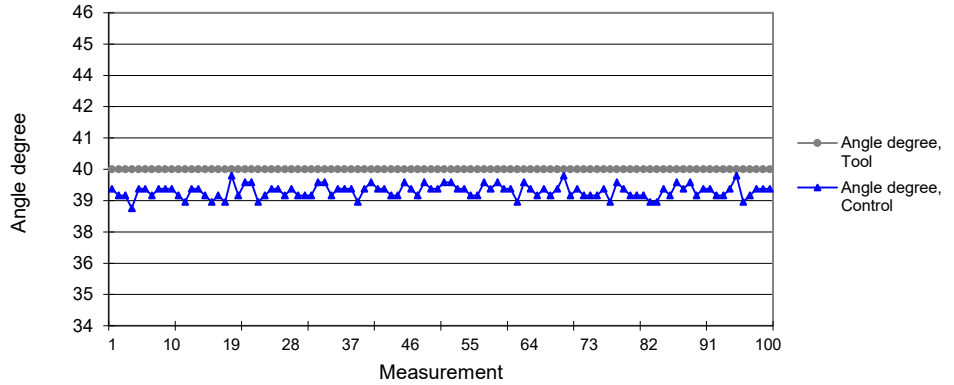
Tool without angle correction

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	2.97	40.00	3.01	39.25	0.04	0.75
2	3.02	40.00	3.04	39.00	0.02	1.00
3	2.98	40.00	3.02	39.00	0.04	1.00
4	2.99	40.00	3.01	38.50	0.02	1.50
5	2.89	40.00	2.92	39.25	0.03	0.75
6	2.98	40.00	3.00	39.25	0.02	0.75
7	2.98	40.00	3.01	39.00	0.03	1.00
8	2.99	40.00	3.03	39.25	0.04	0.75
9	2.94	40.00	2.99	39.25	0.05	0.75
10	2.96	40.00	2.97	39.25	0.01	0.75
11	3.02	40.00	3.02	39.00	0.00	1.00
12	2.98	40.00	3.01	38.75	0.03	1.25
13	2.98	40.00	3.00	39.25	0.02	0.75
14	2.87	40.00	2.91	39.25	0.04	0.75
15	2.94	40.00	2.98	39.00	0.04	1.00
16	2.93	40.00	2.97	38.75	0.04	1.25
17	2.92	40.00	2.96	39.00	0.04	1.00
18	2.82	40.00	2.85	38.75	0.03	1.25
19	2.98	40.00	2.98	39.75	0.00	0.25
20	2.97	40.00	2.99	39.00	0.02	1.00
21	2.92	40.00	2.97	39.50	0.05	0.50
22	2.85	40.00	2.88	39.50	0.03	0.50
23	2.96	40.00	2.99	38.75	0.03	1.25
24	2.97	40.00	2.97	39.00	0.00	1.00
25	2.94	40.00	3.00	39.25	0.06	0.75
26	2.86	40.00	2.90	39.25	0.04	0.75
27	2.89	40.00	2.89	39.00	0.00	1.00
28	2.94	40.00	2.96	39.25	0.02	0.75
29	2.93	40.00	2.98	39.00	0.05	1.00
30	2.86	40.00	2.89	39.00	0.03	1.00
31	2.86	40.00	2.91	39.00	0.05	1.00
32	2.94	40.00	2.98	39.50	0.04	0.50
33	2.96	40.00	3.01	39.50	0.05	0.50
34	2.91	40.00	2.93	39.00	0.02	1.00
35	2.90	40.00	2.90	39.25	0.00	0.75
36	2.98	40.00	2.98	39.25	0.00	0.75
37	2.97	40.00	3.00	39.25	0.03	0.75
38	2.94	40.00	2.95	38.75	0.01	1.25
39	2.92	40.00	2.92	39.25	0.00	0.75
40	2.98	40.00	2.99	39.50	0.01	0.50
41	2.98	40.00	3.01	39.25	0.03	0.75
42	2.93	40.00	2.98	39.25	0.05	0.75
43	2.84	40.00	2.88	39.00	0.04	1.00
44	2.90	40.00	2.92	39.00	0.02	1.00
45	2.99	40.00	3.02	39.50	0.03	0.50
46	2.92	40.00	2.96	39.25	0.04	0.75
47	2.86	40.00	2.92	39.00	0.06	1.00
48	2.90	40.00	2.95	39.50	0.05	0.50
49	2.96	40.00	2.96	39.25	0.00	0.75
50	2.96	40.00	2.98	39.25	0.02	0.75
51	2.91	40.00	2.93	39.50	0.02	0.50
52	2.90	40.00	2.93	39.50	0.03	0.50
53	2.99	40.00	3.01	39.25	0.02	0.75
54	2.96	40.00	2.98	39.25	0.02	0.75
55	2.94	40.00	2.97	39.00	0.03	1.00
56	2.90	40.00	2.90	39.00	0.00	1.00
57	2.99	40.00	3.02	39.50	0.03	0.50
58	2.99	40.00	3.02	39.25	0.03	0.75
59	2.96	40.00	2.99	39.50	0.03	0.50
60	2.87	40.00	2.89	39.25	0.02	0.75
61	2.98	40.00	2.99	39.25	0.01	0.75
62	2.95	40.00	2.99	38.75	0.04	1.25
63	2.94	40.00	2.97	39.50	0.03	0.50
64	2.87	40.00	2.91	39.25	0.04	0.75
65	2.93	40.00	2.95	39.00	0.02	1.00
66	2.97	40.00	2.98	39.25	0.01	0.75
67	2.92	40.00	2.95	39.00	0.03	1.00
68	2.89	40.00	2.91	39.25	0.02	0.75
69	2.90	40.00	2.92	39.75	0.02	0.25
70	2.92	40.00	2.95	39.00	0.03	1.00
71	2.96	40.00	2.98	39.25	0.02	0.75
72	2.86	40.00	2.90	39.00	0.04	1.00
73	2.91	40.00	2.93	39.00	0.02	1.00
74	2.93	40.00	2.95	39.00	0.02	1.00
75	2.95	40.00	2.97	39.25	0.02	0.75
76	2.87	40.00	2.92	38.75	0.05	1.25
77	2.88	40.00	2.90	39.50	0.02	0.50
78	2.91	40.00	2.95	39.25	0.04	0.75
79	2.98	40.00	3.00	39.00	0.02	1.00
80	2.94	40.00	2.97	39.00	0.03	1.00
81	2.86	40.00	2.88	39.00	0.02	1.00
82	2.96	40.00	3.00	38.75	0.04	1.25
83	2.94	40.00	2.99	38.75	0.05	1.25
84	2.94	40.00	2.97	39.25	0.03	0.75
85	2.88	40.00	2.90	39.00	0.02	1.00
86	2.94	40.00	2.94	39.50	0.00	0.50
87	2.93	40.00	2.96	39.25	0.03	0.75
88	2.98	40.00	3.02	39.50	0.04	0.50
89	2.84	40.00	2.89	39.00	0.05	1.00
90	2.94	40.00	2.95	39.25	0.01	0.75
91	2.90	40.00	2.94	39.25	0.04	0.75
92	2.94	40.00	2.97	39.00	0.03	1.00
93	2.86	40.00	2.91	39.00	0.05	1.00
94	2.89	40.00	2.90	39.25	0.01	0.75
95	2.94	40.00	2.97	39.75	0.03	0.25
96	2.93	40.00	2.95	38.75	0.02	1.25
97	2.89	40.00	2.95	39.00	0.06	1.00
98	2.86	40.00	2.89	39.25	0.03	0.75
99	2.94	40.00	2.97	39.25	0.03	0.75
100	2.97	40.00	2.99	39.25	0.02	0.75
				Standard deviation:	**0.015**	**0.247**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool without angle correction	





Machine Capability Study
Control System

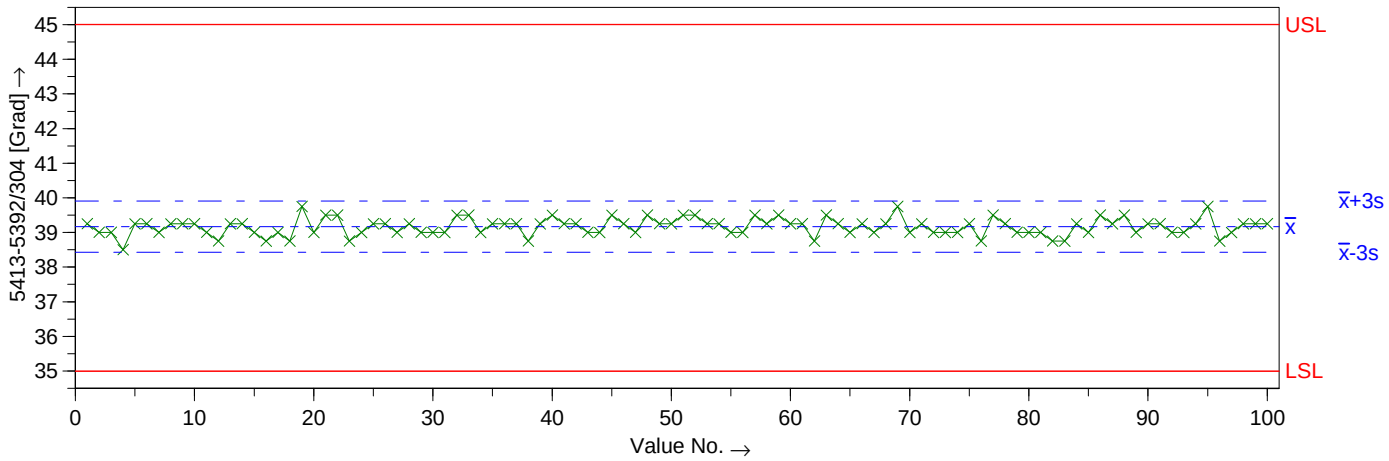
Page 1 / 1

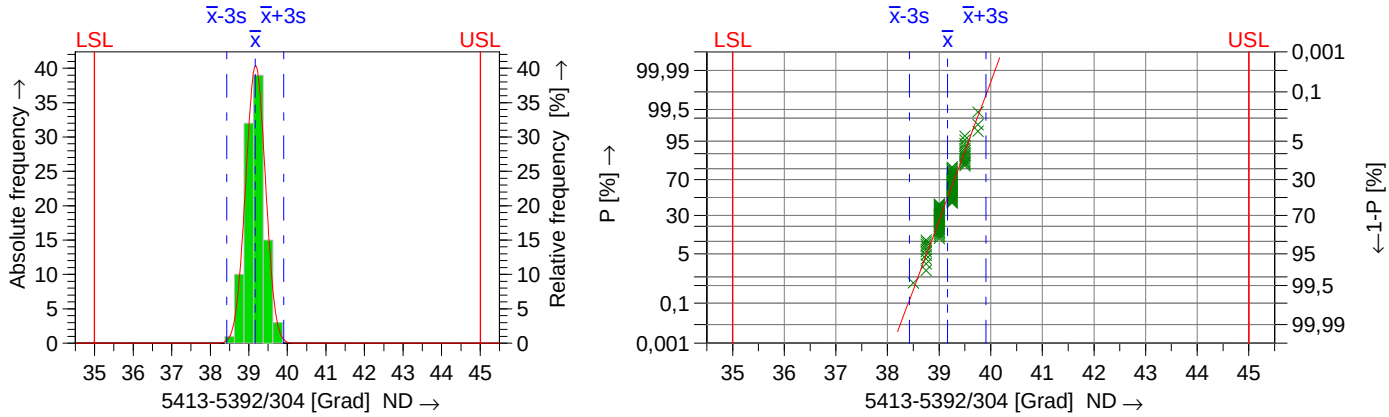
Plant ATG Lexington		Operator Name M. SHERMAN	Date 09.07.2021

Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059k	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 09.07.2021 03:28:52 to 09.07.2021 03:58:33

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 100-50 RPM





Drawing Values		Collected Values		Statistics	
T_m	40.00			$\bar{x}$	39.1650
LSL	35.00	x_{min}	38.50	$\bar{x}$-3s	38.4248
USL	45.00	x_{max}	39.75	$\bar{x}$+3s	39.9052
T	10.00	R	1.25	6s	1.4805
		$n_{<T>}$	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	6.75
Critical capability index	=	C_{mk}	5.63

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.	GC0059k	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,93
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,26
				USL	3,65
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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	3,01	3,04	3,02	3,01	2,92	3,00	3,01	3,03	2,99	2,97
5376169	5413-5392/304	39,25	39,00	39,00	38,50	39,25	39,25	39,00	39,25	39,25	39,25

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	3,02	3,01	3,00	2,91	2,98	2,97	2,96	2,85	2,98	2,99
5376169	5413-5392/304	39,00	38,75	39,25	39,25	39,00	38,75	39,00	38,75	39,75	39,00

Char.No	Char.Descr.	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	x_{27}	x_{28}	x_{29}	x_{30}
5376169	5413-5392/304	2,97	2,88	2,99	2,97	3,00	2,90	2,89	2,96	2,98	2,89
5376169	5413-5392/304	39,50	39,50	38,75	39,00	39,25	39,25	39,00	39,25	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	2,91	2,98	3,01	2,93	2,90	2,98	3,00	2,95	2,92	2,99
5376169	5413-5392/304	39,00	39,50	39,50	39,00	39,25	39,25	39,25	38,75	39,25	39,50

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	3,01	2,98	2,88	2,92	3,02	2,96	2,92	2,95	2,96	2,98
5376169	5413-5392/304	39,25	39,25	39,00	39,00	39,50	39,25	39,00	39,50	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	2,93	2,93	3,01	2,98	2,97	2,90	3,02	3,02	2,99	2,89
5376169	5413-5392/304	39,50	39,50	39,25	39,25	39,00	39,00	39,50	39,25	39,50	39,25

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	2,99	2,99	2,97	2,91	2,95	2,98	2,95	2,91	2,92	2,95
5376169	5413-5392/304	39,25	38,75	39,50	39,25	39,00	39,25	39,00	39,25	39,75	39,00

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	2,98	2,90	2,93	2,95	2,97	2,92	2,90	2,95	3,00	2,97
5376169	5413-5392/304	39,25	39,00	39,00	39,00	39,25	38,75	39,50	39,25	39,00	39,00

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

Ser.No.	GC0059k	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,93
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,26
				USL	3,65
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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	2,88	3,00	2,99	2,97	2,90	2,94	2,96	3,02	2,89	2,95
5376169	5413-5392/304	39,00	38,75	38,75	39,25	39,00	39,50	39,25	39,50	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	2,94	2,97	2,91	2,90	2,97	2,95	2,95	2,89	2,97	2,99
5376169	5413-5392/304	39,25	39,00	39,00	39,25	39,75	38,75	39,00	39,25	39,25	39,25

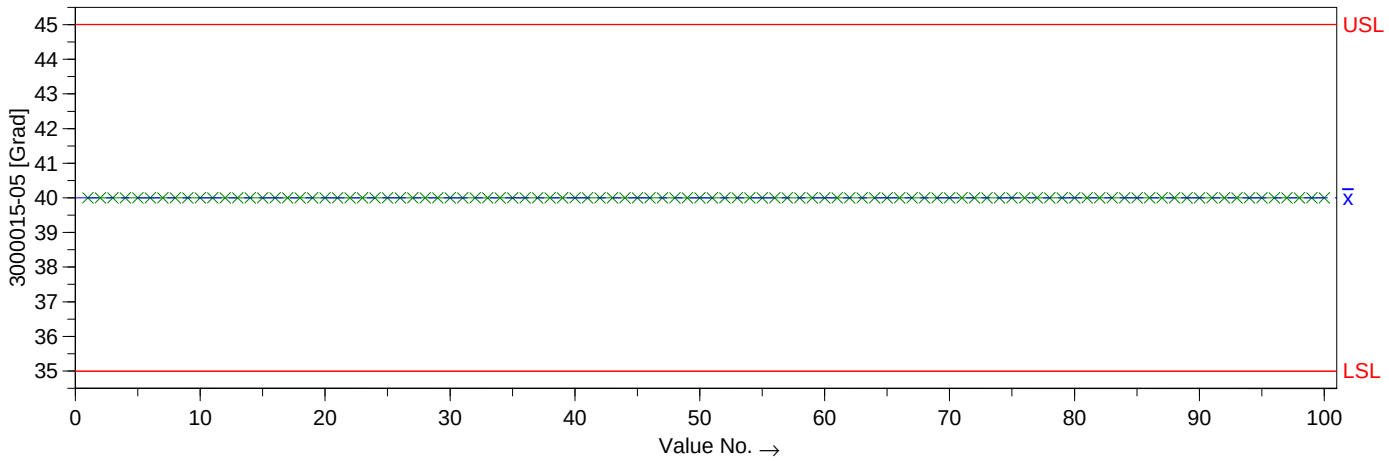
Machine Capability Study
Tool System

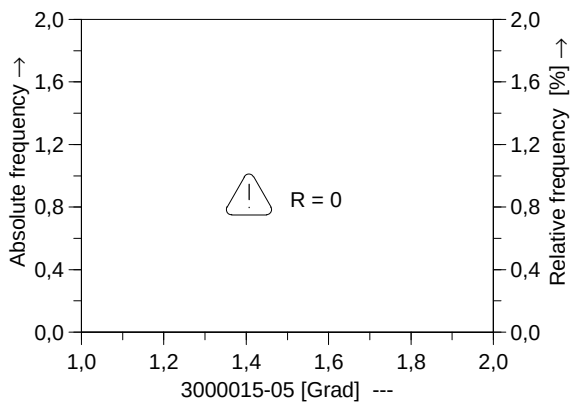
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	09.07.2021		

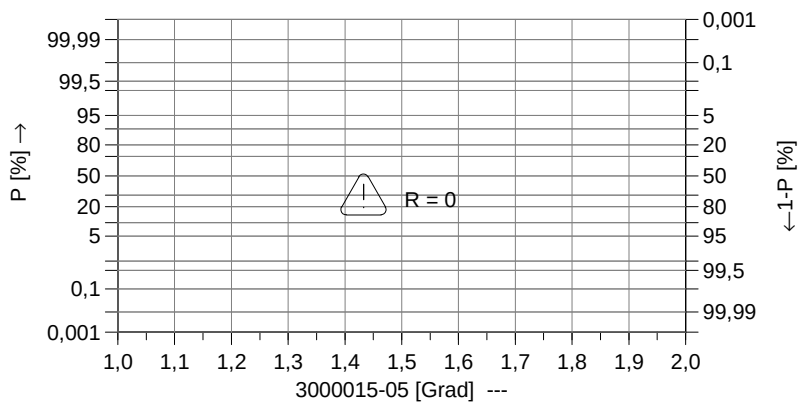
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059k	Char.Descr.	3000015-05	Inspection Val.	40,00	5,00	USL 45,00
		Serial No.	177705	Unit	Grad	-5,00	LSL 35,00
Char.Type	variable			Tolerance value	12 %		Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 09.07.2021 15:28:50 to 09.07.2021 15:58:32

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 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 09.07.2021

Ser.No.	GC0059k	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,51
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	3,62
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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}
177705	3000015-05	2,97	3,02	2,98	2,99	2,89	2,98	2,98	2,99	2,94	2,96
177705	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}
177705	3000015-05	3,02	2,98	2,98	2,87	2,94	2,93	2,92	2,82	2,98	2,97
177705	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}
177705	3000015-05	2,92	2,85	2,96	2,97	2,94	2,86	2,89	2,94	2,93	2,86
177705	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}
177705	3000015-05	2,86	2,94	2,96	2,91	2,90	2,98	2,97	2,94	2,92	2,98
177705	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}
177705	3000015-05	2,98	2,93	2,84	2,90	2,99	2,92	2,86	2,90	2,96	2,96
177705	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}
177705	3000015-05	2,91	2,90	2,99	2,96	2,94	2,90	2,99	2,99	2,96	2,87
177705	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}
177705	3000015-05	2,98	2,95	2,94	2,87	2,93	2,97	2,92	2,89	2,90	2,92
177705	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}
177705	3000015-05	2,96	2,86	2,91	2,93	2,95	2,87	2,88	2,91	2,98	2,94
177705	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 09.07.2021

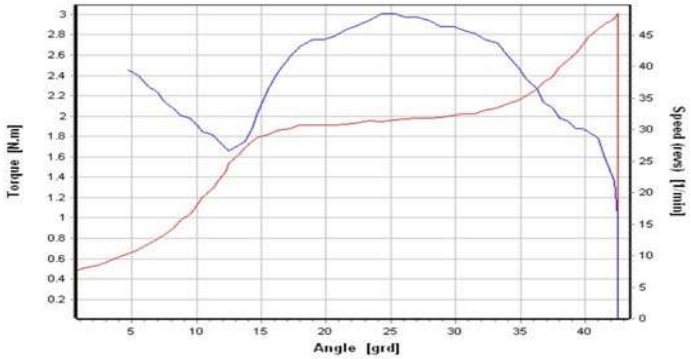
Ser.No.	GC0059k	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,51
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	3,62
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177705	3000015-05	2,86	2,96	2,94	2,94	2,88	2,94	2,93	2,98	2,84	2,94
177705	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

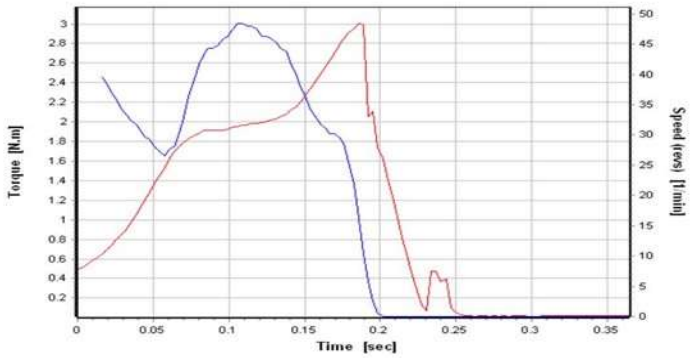
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	2,90	2,94	2,86	2,89	2,94	2,93	2,89	2,86	2,94	2,97
177705	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Torque graphs

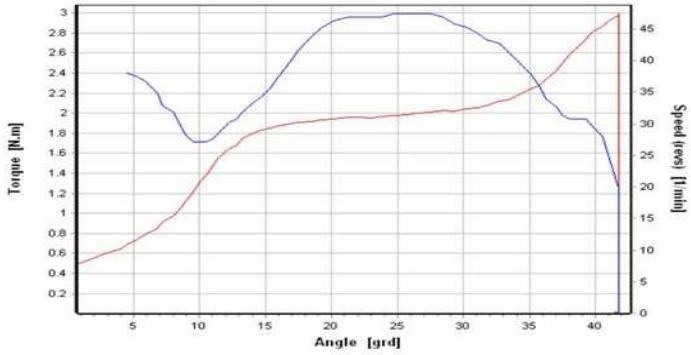
Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool without angle correction	



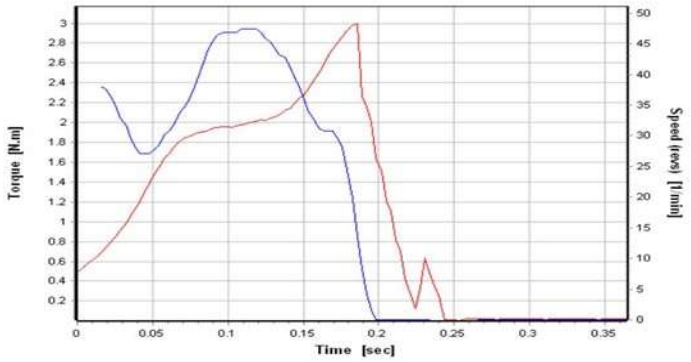
Value no. 1
Graph
Torque / Angle / Speed



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:** GC0059

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: 4.26 % ± **2.13 %**

Angle degree: 40° Tolerance: 6.1° ± **3.0°**

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

Tool with angle correction

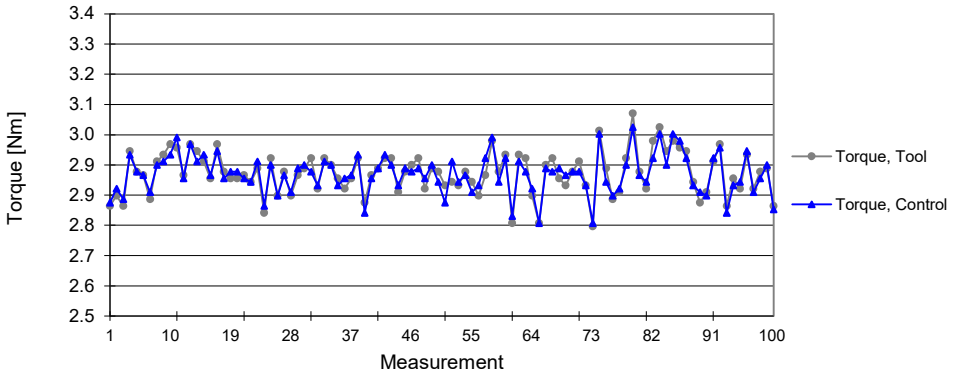
For measurements, the screwdriver must be held by hand and alternately moved.
In the column "Move **+**", the angle range in the screw direction,
In the column "Move **-**" of the direction opposite the direction of tightening,
within this range, the tool has to be moved.
Pay attention to changing angle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

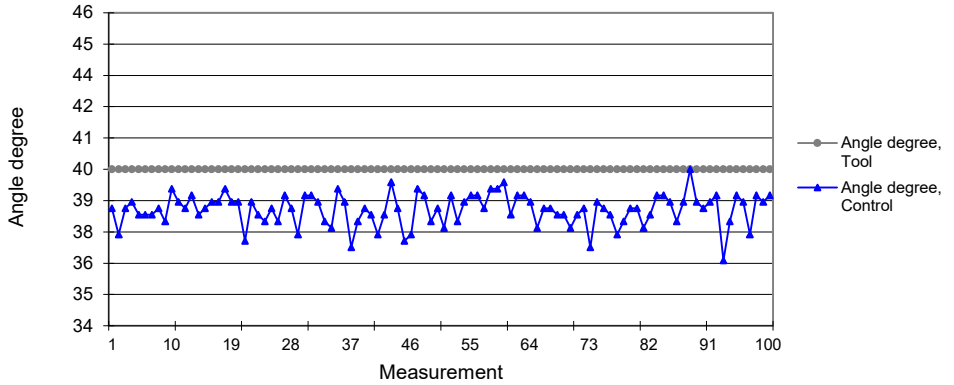
Move		Test conditions
+	**-**	
0	**0-25°**	Tool hand held

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	2.82	40.00	2.83	38.50	0.01	1.50
2	2.85	40.00	2.87	37.50	0.02	2.50
3	2.82	40.00	2.84	38.50	0.02	1.50
4	2.98	40.00	2.97	38.75	0.01	1.25
5	2.92	40.00	2.92	38.25	0.00	1.75
6	2.91	40.00	2.91	38.25	0.00	1.75
7	2.84	40.00	2.86	38.25	0.02	1.75
8	2.95	40.00	2.94	38.50	0.01	1.50
9	2.97	40.00	2.95	38.00	0.02	2.00
10	3.00	40.00	2.97	39.25	0.03	0.75
11	2.99	40.00	3.02	38.75	0.03	1.25
12	2.91	40.00	2.90	38.50	0.01	1.50
13	3.00	40.00	3.00	39.00	0.00	1.00
14	2.98	40.00	2.95	38.25	0.03	1.75
15	2.95	40.00	2.97	38.50	0.02	1.50
16	2.90	40.00	2.91	38.75	0.01	1.25
17	3.00	40.00	2.98	38.75	0.02	1.25
18	2.92	40.00	2.90	39.25	0.02	0.75
19	2.90	40.00	2.92	38.75	0.02	1.25
20	2.90	40.00	2.92	38.75	0.02	1.25
21	2.91	40.00	2.90	37.25	0.01	2.75
22	2.89	40.00	2.89	38.75	0.00	1.25
23	2.93	40.00	2.95	38.25	0.02	1.75
24	2.80	40.00	2.82	38.00	0.02	2.00
25	2.96	40.00	2.94	38.50	0.02	1.50
26	2.85	40.00	2.85	38.00	0.00	2.00
27	2.92	40.00	2.91	39.00	0.01	1.00
28	2.85	40.00	2.86	38.50	0.01	1.50
29	2.91	40.00	2.93	37.50	0.02	2.50
30	2.93	40.00	2.94	39.00	0.01	1.00
31	2.96	40.00	2.92	39.00	0.04	1.00
32	2.87	40.00	2.88	38.75	0.01	1.25
33	2.96	40.00	2.95	38.00	0.01	2.00
34	2.94	40.00	2.94	37.75	0.00	2.25
35	2.90	40.00	2.88	39.25	0.02	0.75
36	2.87	40.00	2.90	38.75	0.03	1.25
37	2.90	40.00	2.91	37.00	0.01	3.00
38	2.96	40.00	2.97	38.00	0.01	2.00
39	2.83	40.00	2.80	38.50	0.03	1.50
40	2.91	40.00	2.90	38.25	0.01	1.75
41	2.93	40.00	2.93	37.50	0.00	2.50
42	2.96	40.00	2.97	38.25	0.01	1.75
43	2.96	40.00	2.94	39.50	0.02	0.50
44	2.86	40.00	2.88	38.50	0.02	1.50
45	2.92	40.00	2.93	37.25	0.01	2.75
46	2.94	40.00	2.92	37.50	0.02	2.50
47	2.96	40.00	2.93	39.25	0.03	0.75
48	2.87	40.00	2.90	39.00	0.03	1.00
49	2.93	40.00	2.94	38.00	0.01	2.00
50	2.92	40.00	2.89	38.50	0.03	1.50
51	2.88	40.00	2.83	37.75	0.05	2.25
52	2.89	40.00	2.95	39.00	0.06	1.00
53	2.88	40.00	2.89	38.00	0.01	2.00
54	2.92	40.00	2.91	38.75	0.01	1.25
55	2.89	40.00	2.86	39.00	0.03	1.00
56	2.85	40.00	2.88	39.00	0.03	1.00
57	2.91	40.00	2.96	38.50	0.05	1.50
58	3.01	40.00	3.02	39.25	0.01	0.75
59	2.92	40.00	2.89	39.25	0.03	0.75
60	2.97	40.00	2.96	39.50	0.01	0.50
61	2.77	40.00	2.79	38.25	0.02	1.75
62	2.97	40.00	2.95	39.00	0.02	1.00
63	2.96	40.00	2.92	39.00	0.04	1.00
64	2.85	40.00	2.87	38.75	0.02	1.25
65	2.77	40.00	2.77	37.75	0.00	2.25
66	2.94	40.00	2.93	38.50	0.01	1.50
67	2.96	40.00	2.92	38.50	0.04	1.50
68	2.90	40.00	2.93	38.25	0.03	1.75
69	2.88	40.00	2.91	38.25	0.03	1.75
70	2.92	40.00	2.92	37.75	0.00	2.25
71	2.95	40.00	2.92	38.25	0.03	1.75
72	2.88	40.00	2.88	38.50	0.00	1.50
73	2.76	40.00	2.77	37.00	0.01	3.00
74	3.04	40.00	3.03	38.75	0.01	1.25
75	2.93	40.00	2.89	38.50	0.04	1.50
76	2.84	40.00	2.85	38.25	0.01	1.75
77	2.86	40.00	2.87	37.50	0.01	2.50
78	2.96	40.00	2.94	38.00	0.02	2.00
79	3.09	40.00	3.05	38.50	0.04	1.50
80	2.92	40.00	2.91	38.50	0.01	1.50
81	2.87	40.00	2.89	37.75	0.02	2.25
82	3.01	40.00	2.96	38.25	0.05	1.75
83	3.05	40.00	3.03	39.00	0.02	1.00
84	2.98	40.00	2.94	39.00	0.04	1.00
85	3.01	40.00	3.03	38.75	0.02	1.25
86	2.99	40.00	3.01	38.00	0.02	2.00
87	2.98	40.00	2.96	38.75	0.02	1.25
88	2.89	40.00	2.88	40.00	0.01	0.00
89	2.83	40.00	2.86	38.75	0.03	1.25
90	2.86	40.00	2.85	38.50	0.01	1.50
91	2.95	40.00	2.96	38.75	0.01	1.25
92	3.00	40.00	2.99	39.00	0.01	1.00
93	2.82	40.00	2.80	36.50	0.02	3.50
94	2.90	40.00	2.88	38.00	0.02	2.00
95	2.87	40.00	2.89	39.00	0.02	1.00
96	2.97	40.00	2.98	38.75	0.01	1.25
97	2.87	40.00	2.86	37.50	0.01	2.50
98	2.92	40.00	2.90	39.00	0.02	1.00
99	2.93	40.00	2.94	38.75	0.01	1.25
100	2.82	40.00	2.81	39.00	0.01	1.00
				Standard deviation:	**0.013**	**0.605**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool with angle correction	





Machine Capability Study
Control System

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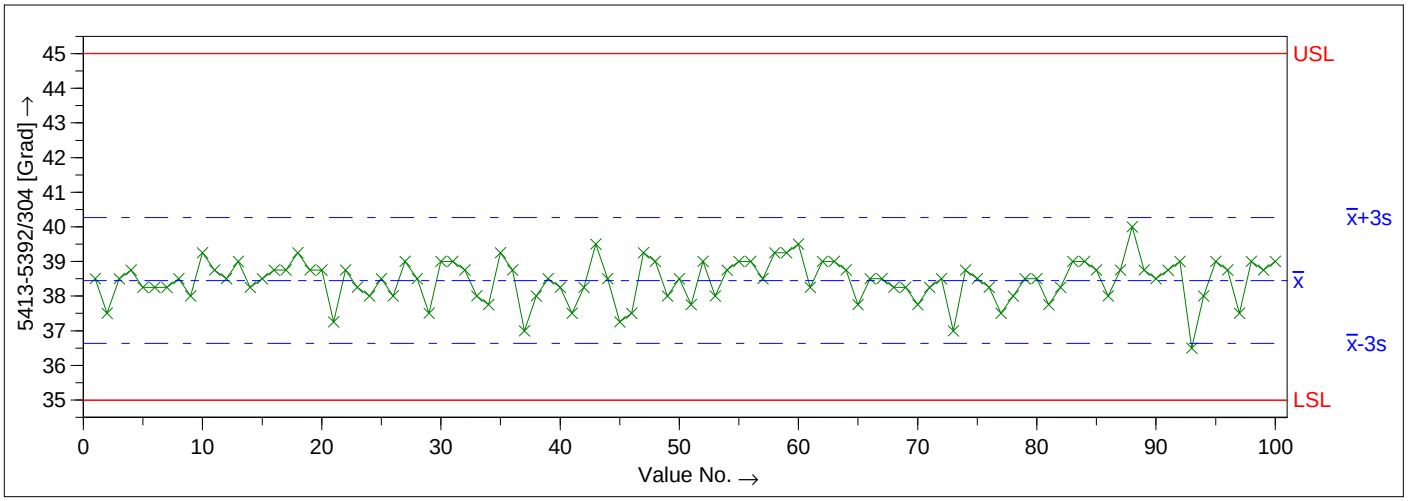
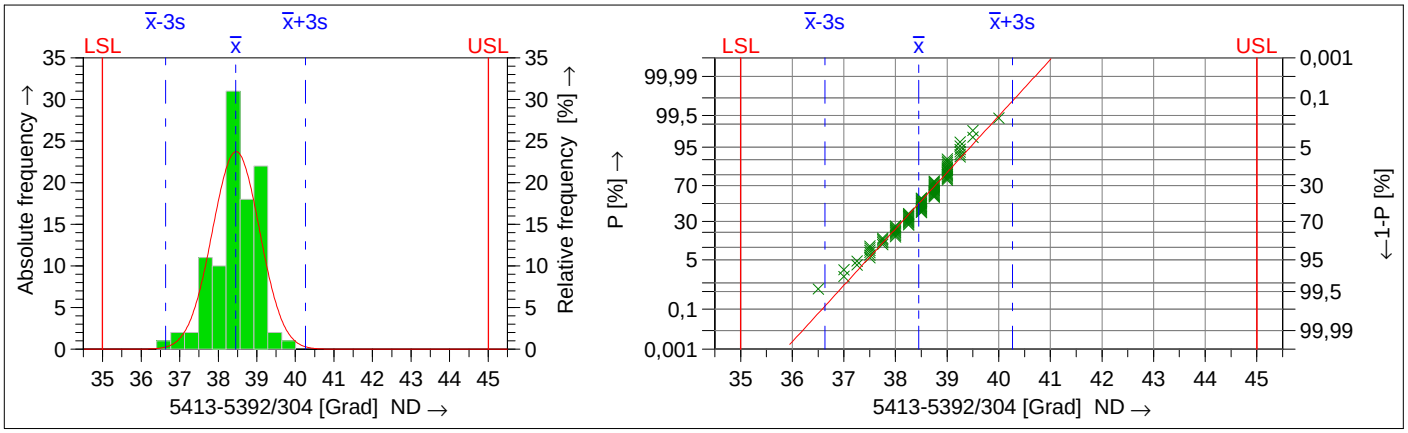
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	03.08.2021		

Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059m	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 09:41:12 to 03.08.2021 09:59:56

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 100-50 RPM; with Gyroscope





Drawing Values		Collected Values		Statistics	
T_m	40.00			$\bar{x}$	38.4500
LSL	35.00	x_{min}	36.50	$\bar{x}$-3s	36.6347
USL	45.00	x_{max}	40.00	$\bar{x}$+3s	40.2653
T	10.00	R	3.50	6s	3.6307
		$n_{<T>}$	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	2.75
Critical capability index	=	C_{mk}	1.90

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.	GC0059m	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,91
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,18
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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	2,83	2,87	2,84	2,97	2,92	2,91	2,86	2,94	2,95	2,97
5376169	5413-5392/304	38,50	37,50	38,50	38,75	38,25	38,25	38,25	38,50	38,00	39,25

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	3,02	2,90	3,00	2,95	2,97	2,91	2,98	2,90	2,92	2,92
5376169	5413-5392/304	38,75	38,50	39,00	38,25	38,50	38,75	38,75	39,25	38,75	38,75

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	2,90	2,89	2,95	2,82	2,94	2,85	2,91	2,86	2,93	2,94
5376169	5413-5392/304	37,25	38,75	38,25	38,00	38,50	38,00	39,00	38,50	37,50	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	2,92	2,88	2,95	2,94	2,88	2,90	2,91	2,97	2,80	2,90
5376169	5413-5392/304	39,00	38,75	38,00	37,75	39,25	38,75	37,00	38,00	38,50	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	2,93	2,97	2,94	2,88	2,93	2,92	2,93	2,90	2,94	2,89
5376169	5413-5392/304	37,50	38,25	39,50	38,50	37,25	37,50	39,25	39,00	38,00	38,50

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	2,83	2,95	2,89	2,91	2,86	2,88	2,96	3,02	2,89	2,96
5376169	5413-5392/304	37,75	39,00	38,00	38,75	39,00	39,00	38,50	39,25	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	2,79	2,95	2,92	2,87	2,77	2,93	2,92	2,93	2,91	2,92
5376169	5413-5392/304	38,25	39,00	39,00	38,75	37,75	38,50	38,50	38,25	38,25	37,75

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	2,92	2,88	2,77	3,03	2,89	2,85	2,87	2,94	3,05	2,91
5376169	5413-5392/304	38,25	38,50	37,00	38,75	38,50	38,25	37,50	38,00	38,50	38,50

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 03.08.2021

Ser.No.	GC0059m	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	2,91
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	2,18
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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	2,89	2,96	3,03	2,94	3,03	3,01	2,96	2,88	2,86	2,85
5376169	5413-5392/304	37,75	38,25	39,00	39,00	38,75	38,00	38,75	40,00	38,75	38,50

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	2,96	2,99	2,80	2,88	2,89	2,98	2,86	2,90	2,94	2,81
5376169	5413-5392/304	38,75	39,00	36,50	38,00	39,00	38,75	37,50	39,00	38,75	39,00

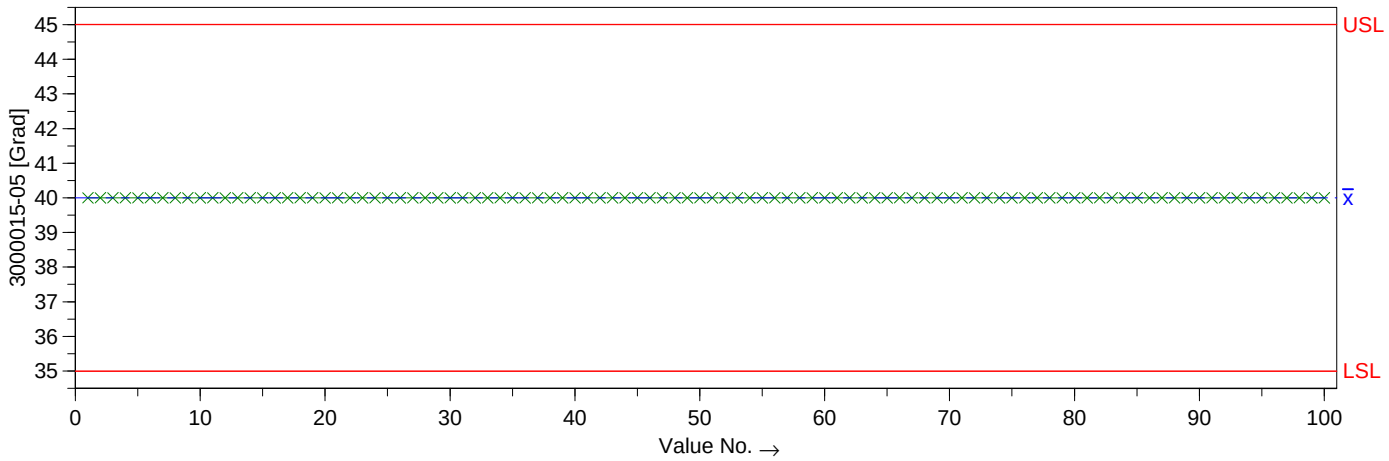
Machine Capability Study
Tool System

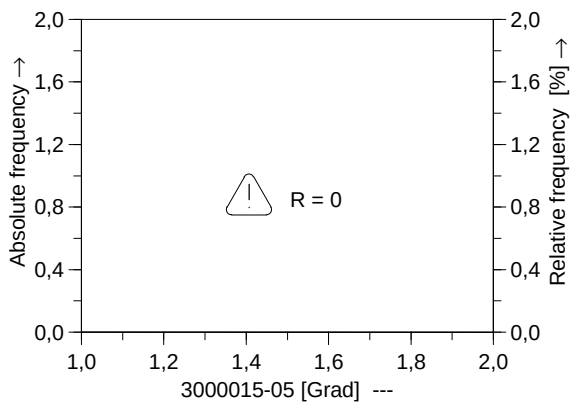
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	03.08.2021		

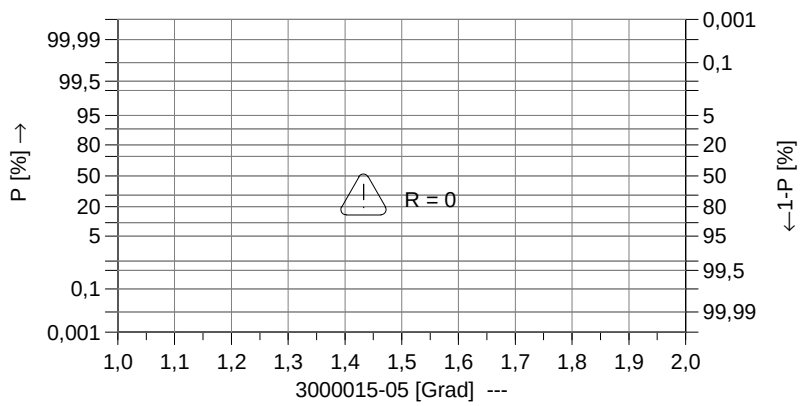
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059m	Char.Descr.	3000015-05	Inspection Val.	40,00	5,00	USL 45,00
		Serial No.	177705	Unit	Grad	-5,00	LSL 35,00
Char.Type	variable			Tolerance value	12 %		Decimal Pl. 2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 03.08.2021 09:41:11 to 03.08.2021 09:59:54

Rem. TQ 60% angle 40 +/-5° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 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.	GC0059m	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,55
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 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}
177705	3000015-05	2,82	2,85	2,82	2,98	2,92	2,91	2,84	2,95	2,97	3,00
177705	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}
177705	3000015-05	2,99	2,91	3,00	2,98	2,95	2,90	3,00	2,92	2,90	2,90
177705	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}
177705	3000015-05	2,91	2,89	2,93	2,80	2,96	2,85	2,92	2,85	2,91	2,93
177705	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}
177705	3000015-05	2,96	2,87	2,96	2,94	2,90	2,87	2,90	2,96	2,83	2,91
177705	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}
177705	3000015-05	2,93	2,96	2,96	2,86	2,92	2,94	2,96	2,87	2,93	2,92
177705	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}
177705	3000015-05	2,88	2,89	2,88	2,92	2,89	2,85	2,91	3,01	2,92	2,97
177705	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}
177705	3000015-05	2,77	2,97	2,96	2,85	2,77	2,94	2,96	2,90	2,88	2,92
177705	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}
177705	3000015-05	2,95	2,88	2,76	3,04	2,93	2,84	2,86	2,96	3,09	2,92
177705	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

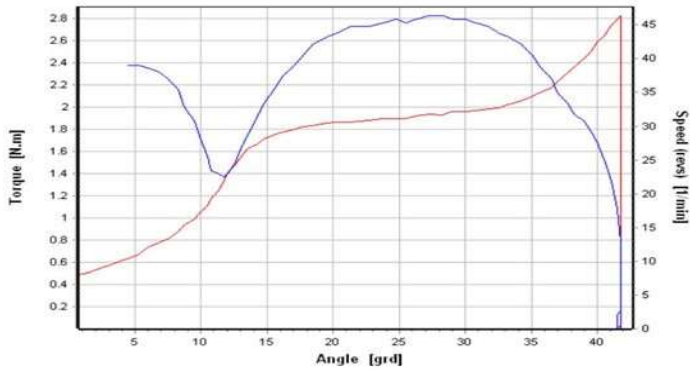
Ser.No.	GC0059m	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,55
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	3,72
Remark	TQ 60% angle 40 +/-5°* TQ-Cal: 5.84 Nm; Cur- Cal: 0.0384 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177705	3000015-05	2,87	3,01	3,05	2,98	3,01	2,99	2,98	2,89	2,83	2,86
177705	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

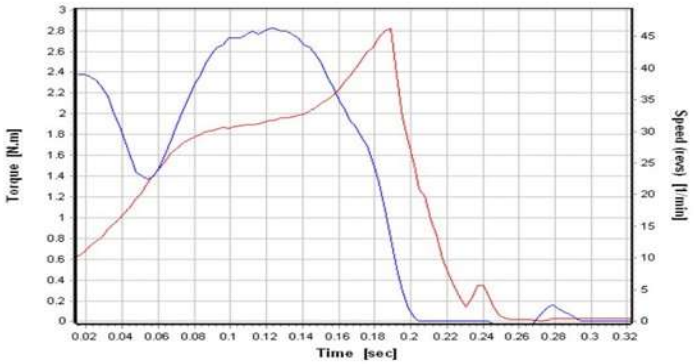
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	2,95	3,00	2,82	2,90	2,87	2,97	2,87	2,92	2,93	2,82
177705	3000015-05	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00	40,00

Torque graphs

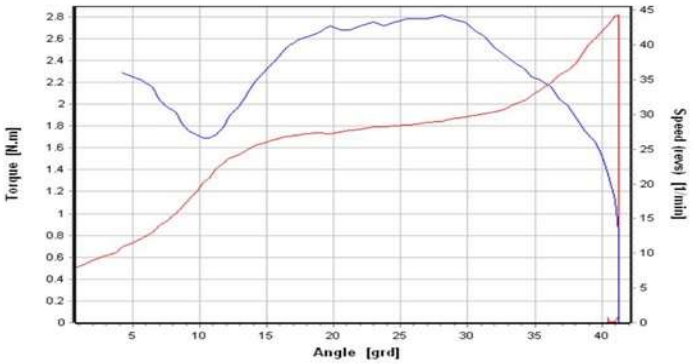
Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**2.94 Nm**	60 % of max. torque	
Angle degree:	**40°**	Tool with angle correction	



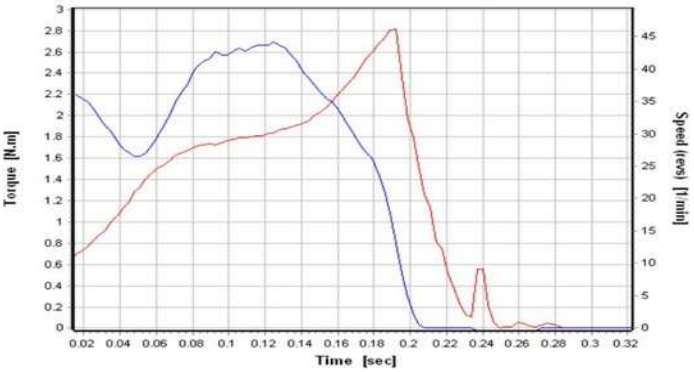
Value no. 1
Graph
Torque / Angle / Speed



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:** GC0059

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: 2.44 % ± **1.22 %**

Angle degree: 180° Tolerance: 3.8° ± **1.9°**

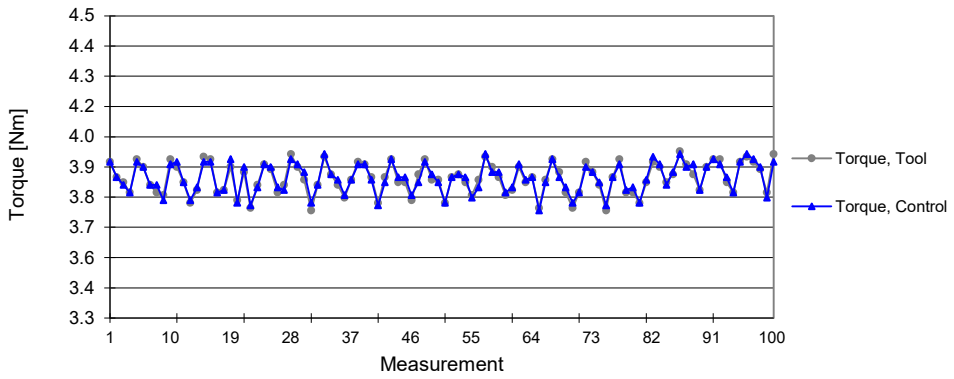
Formula derivation: $C_m = \frac{T}{6\,s}$ $T = C_m * 6\,s$

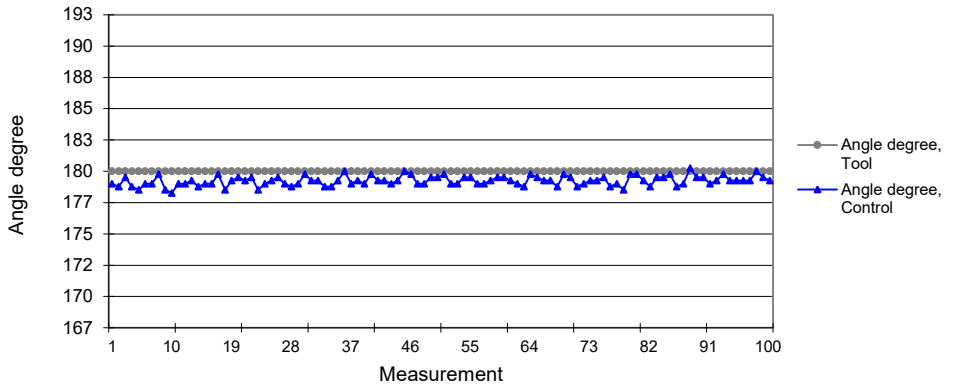
Tool without angle correction

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	3.94	180.00	3.94	179.00	0.00	1.00
2	3.88	180.00	3.88	178.75	0.00	1.25
3	3.86	180.00	3.85	179.50	0.01	0.50
4	3.82	180.00	3.82	178.75	0.00	1.25
5	3.95	180.00	3.94	178.50	0.01	1.50
6	3.92	180.00	3.92	179.00	0.00	1.00
7	3.85	180.00	3.85	179.00	0.00	1.00
8	3.82	180.00	3.85	179.75	0.03	0.25
9	3.81	180.00	3.79	178.50	0.02	1.50
10	3.95	180.00	3.93	178.25	0.02	1.75
11	3.92	180.00	3.94	179.00	0.02	1.00
12	3.86	180.00	3.86	179.00	0.00	1.00
13	3.78	180.00	3.79	179.25	0.01	0.75
14	3.83	180.00	3.84	178.75	0.01	1.25
15	3.96	180.00	3.94	179.00	0.02	1.00
16	3.95	180.00	3.94	179.00	0.01	1.00
17	3.82	180.00	3.82	179.75	0.00	0.25
18	3.83	180.00	3.83	178.50	0.00	1.50
19	3.92	180.00	3.95	179.25	0.03	0.75
20	3.79	180.00	3.78	179.50	0.01	0.50
21	3.90	180.00	3.92	179.25	0.02	0.75
22	3.76	180.00	3.77	179.50	0.01	0.50
23	3.85	180.00	3.84	178.50	0.01	1.50
24	3.93	180.00	3.93	179.00	0.00	1.00
25	3.91	180.00	3.92	179.25	0.01	0.75
26	3.82	180.00	3.84	179.50	0.02	0.50
27	3.85	180.00	3.83	179.00	0.02	1.00
28	3.97	180.00	3.95	178.75	0.02	1.25
29	3.92	180.00	3.93	179.00	0.01	1.00
30	3.87	180.00	3.90	179.75	0.03	0.25
31	3.75	180.00	3.78	179.25	0.03	0.75
32	3.85	180.00	3.85	179.25	0.00	0.75
33	3.96	180.00	3.97	178.75	0.01	1.25
34	3.89	180.00	3.89	178.75	0.00	1.25
35	3.85	180.00	3.87	179.25	0.02	0.75
36	3.80	180.00	3.81	180.00	0.01	0.00
37	3.87	180.00	3.87	179.00	0.00	1.00
38	3.94	180.00	3.93	179.25	0.01	0.75
39	3.93	180.00	3.93	179.00	0.00	1.00
40	3.88	180.00	3.87	179.75	0.01	0.25
41	3.78	180.00	3.77	179.25	0.01	0.75
42	3.88	180.00	3.86	179.25	0.02	0.75
43	3.95	180.00	3.95	179.00	0.00	1.00
44	3.86	180.00	3.88	179.25	0.02	0.75
45	3.86	180.00	3.88	180.00	0.02	0.00
46	3.79	180.00	3.81	179.75	0.02	0.25
47	3.89	180.00	3.86	179.00	0.03	1.00
48	3.95	180.00	3.94	179.00	0.01	1.00
49	3.87	180.00	3.89	179.50	0.02	0.50
50	3.87	180.00	3.86	179.50	0.01	0.50
51	3.78	180.00	3.78	179.75	0.00	0.25
52	3.88	180.00	3.88	179.00	0.00	1.00
53	3.89	180.00	3.89	179.00	0.00	1.00
54	3.86	180.00	3.88	179.50	0.02	0.50
55	3.81	180.00	3.80	179.50	0.01	0.50
56	3.87	180.00	3.84	179.00	0.03	1.00
57	3.96	180.00	3.97	179.00	0.01	1.00
58	3.92	180.00	3.90	179.25	0.02	0.75
59	3.88	180.00	3.90	179.50	0.02	0.50
60	3.81	180.00	3.82	179.50	0.01	0.50
61	3.83	180.00	3.84	179.25	0.01	0.75
62	3.92	180.00	3.93	179.00	0.01	1.00
63	3.86	180.00	3.87	178.75	0.01	1.25
64	3.88	180.00	3.88	179.75	0.00	0.25
65	3.76	180.00	3.75	179.50	0.01	0.50
66	3.87	180.00	3.86	179.25	0.01	0.75
67	3.95	180.00	3.95	179.25	0.00	0.75
68	3.90	180.00	3.88	178.75	0.02	1.25
69	3.82	180.00	3.84	179.75	0.02	0.25
70	3.76	180.00	3.78	179.50	0.02	0.50
71	3.82	180.00	3.82	178.75	0.00	1.25
72	3.94	180.00	3.92	179.00	0.02	1.00
73	3.90	180.00	3.90	179.25	0.00	0.75
74	3.85	180.00	3.86	179.25	0.01	0.75
75	3.75	180.00	3.77	179.50	0.02	0.50
76	3.88	180.00	3.88	178.75	0.00	1.25
77	3.95	180.00	3.93	179.00	0.02	1.00
78	3.82	180.00	3.83	178.50	0.01	1.50
79	3.82	180.00	3.84	179.75	0.02	0.25
80	3.78	180.00	3.78	179.75	0.00	0.25
81	3.86	180.00	3.87	179.25	0.01	0.75
82	3.94	180.00	3.96	178.75	0.02	1.25
83	3.92	180.00	3.93	179.50	0.01	0.50
84	3.86	180.00	3.85	179.50	0.01	0.50
85	3.89	180.00	3.90	179.75	0.01	0.25
86	3.98	180.00	3.97	178.75	0.01	1.25
87	3.93	180.00	3.92	179.00	0.01	1.00
88	3.89	180.00	3.93	180.25	0.04	0.25
89	3.83	180.00	3.83	179.50	0.00	0.50
90	3.92	180.00	3.92	179.50	0.00	0.50
91	3.95	180.00	3.95	179.00	0.00	1.00
92	3.95	180.00	3.93	179.25	0.02	0.75
93	3.86	180.00	3.88	179.75	0.02	0.25
94	3.82	180.00	3.82	179.25	0.00	0.75
95	3.94	180.00	3.94	179.25	0.00	0.75
96	3.96	180.00	3.97	179.25	0.01	0.75
97	3.94	180.00	3.95	179.25	0.01	0.75
98	3.91	180.00	3.92	180.00	0.01	0.00
99	3.82	180.00	3.80	179.50	0.02	0.50
100	3.97	180.00	3.94	179.25	0.03	0.75
				Standard deviation:	**0.010**	**0.379**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool without angle correction	





Machine Capability Study
Control System

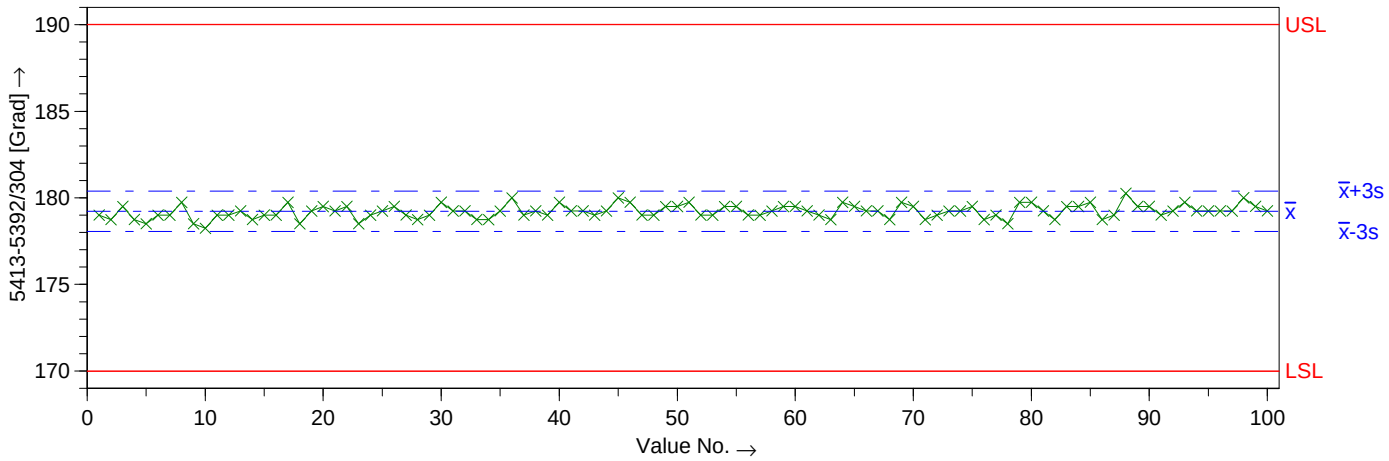
Cleco Production Tools

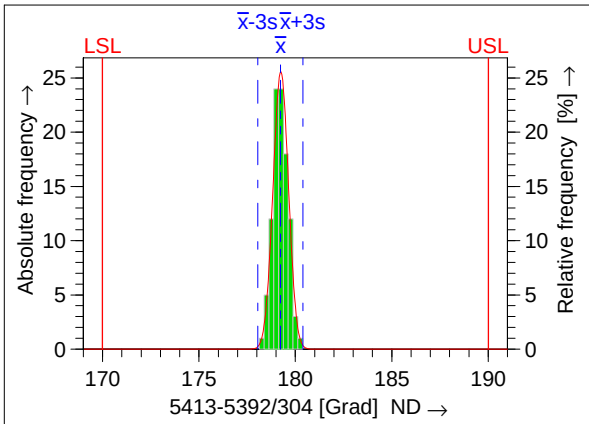
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	09.07.2021		

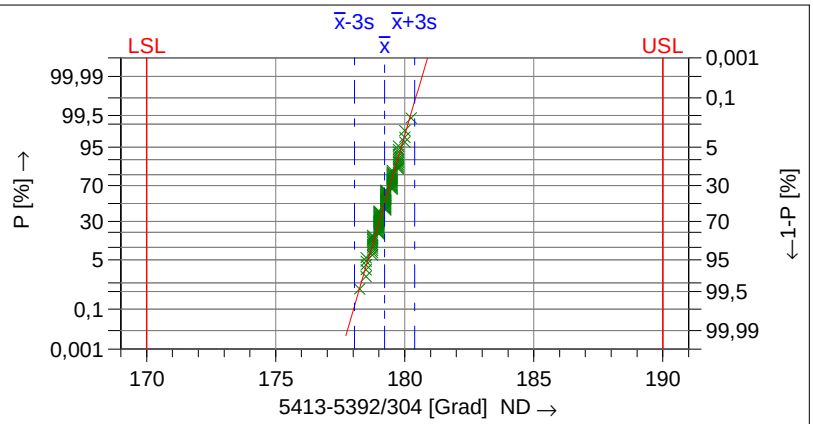
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059l	Char.Descr.	5413-5392/304	Inspection Val.	180,00 10,00	USL	190,00
		Serial No.	5376169	Unit	Grad -10,00	LSL	170,00
Char.Type	variable			Tolerance value	6 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 09.07.2021 04:04:21 to 09.07.2021 04:34:02

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 100-50 RPM







Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	179.2200
LSL	170.00	x_{min}	178.25	$\bar{x}$-3s	178.0509
USL	190.00	x_{max}	180.25	$\bar{x}$+3s	180.3891
T	20.00	R	2.00	6s	2.3382
		$n_{<T>}$	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	8.55
Critical capability index	=	C_{mk}	7.89

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.	GC0059l	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,87
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,00
				USL	4,78
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.84 Nm; Cu r-Cal: 0.0384 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	3,94	3,88	3,85	3,82	3,94	3,92	3,85	3,85	3,79	3,93
5376169	5413-5392/304	179,00	178,75	179,50	178,75	178,50	179,00	179,00	179,75	178,50	178,25

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	3,94	3,86	3,79	3,84	3,94	3,94	3,82	3,83	3,95	3,78
5376169	5413-5392/304	179,00	179,00	179,25	178,75	179,00	179,00	179,75	178,50	179,25	179,50

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	3,92	3,77	3,84	3,93	3,92	3,84	3,83	3,95	3,93	3,90
5376169	5413-5392/304	179,25	179,50	178,50	179,00	179,25	179,50	179,00	178,75	179,00	179,75

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	3,78	3,85	3,97	3,89	3,87	3,81	3,87	3,93	3,93	3,87
5376169	5413-5392/304	179,25	179,25	178,75	178,75	179,25	180,00	179,00	179,25	179,00	179,75

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	3,77	3,86	3,95	3,88	3,88	3,81	3,86	3,94	3,89	3,86
5376169	5413-5392/304	179,25	179,25	179,00	179,25	180,00	179,75	179,00	179,00	179,50	179,50

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	3,78	3,88	3,89	3,88	3,80	3,84	3,97	3,90	3,90	3,82
5376169	5413-5392/304	179,75	179,00	179,00	179,50	179,50	179,00	179,00	179,25	179,50	179,50

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	3,84	3,93	3,87	3,88	3,75	3,86	3,95	3,88	3,84	3,78
5376169	5413-5392/304	179,25	179,00	178,75	179,75	179,50	179,25	179,25	178,75	179,75	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	3,82	3,92	3,90	3,86	3,77	3,88	3,93	3,83	3,84	3,78
5376169	5413-5392/304	178,75	179,00	179,25	179,25	179,50	178,75	179,00	178,50	179,75	179,75

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 09.07.2021

Ser.No.	GC0059l	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,87
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,00
				USL	4,78
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.84 Nm; Cu r-Cal: 0.0384 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	3,96	3,93	3,85	3,90	3,97	3,92	3,93	3,83	3,92
5376169	5413-5392/304	179,25	178,75	179,50	179,50	179,75	178,75	179,00	180,25	179,50	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	3,95	3,93	3,88	3,82	3,94	3,97	3,95	3,92	3,80	3,94
5376169	5413-5392/304	179,00	179,25	179,75	179,25	179,25	179,25	179,25	180,00	179,50	179,25

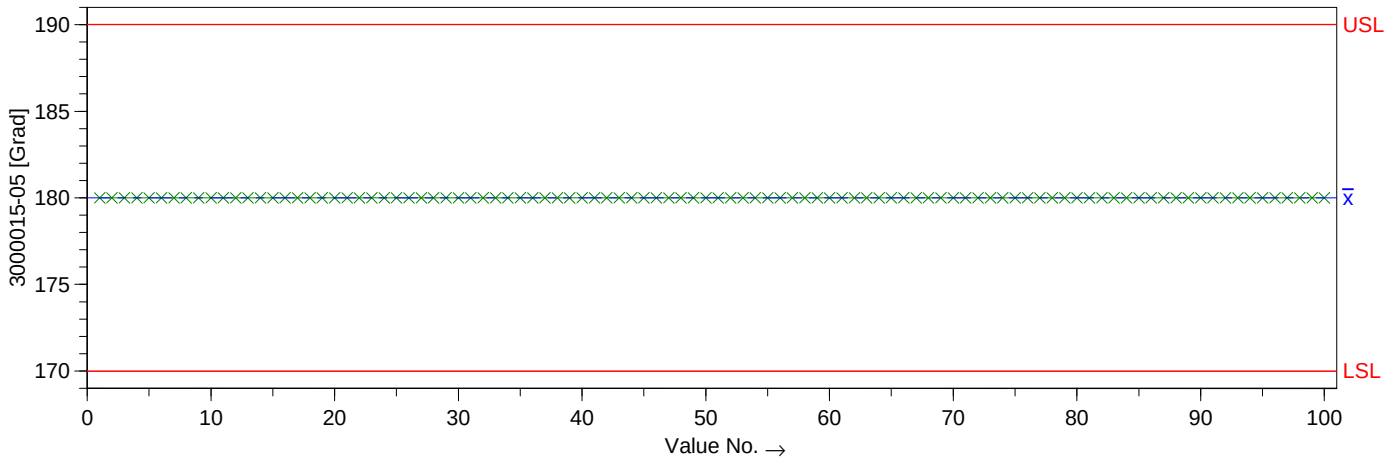
Machine Capability Study
Tool System

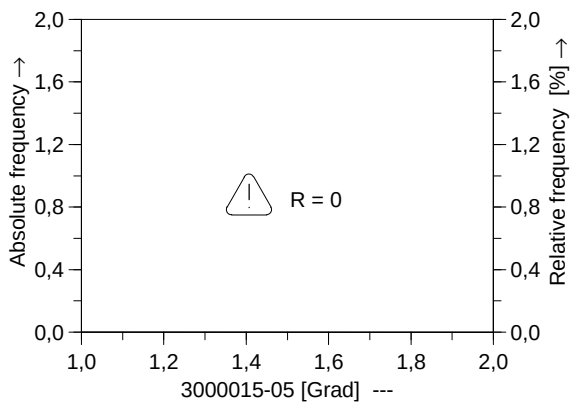
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	09.07.2021		

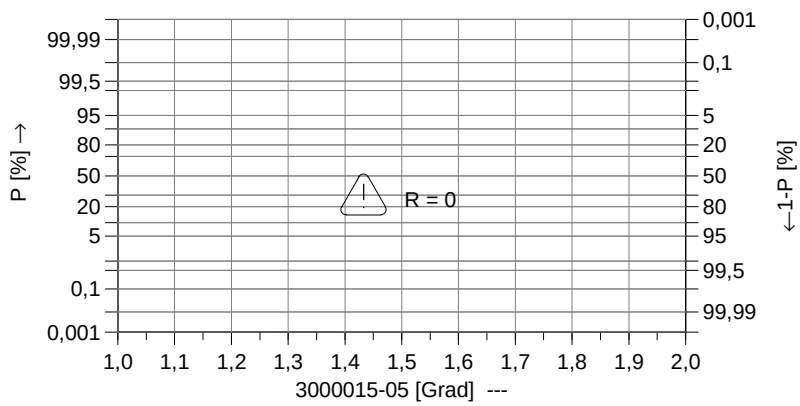
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059l	Char.Descr.	3000015-05	Inspection Val.	180,00 10,00	USL	190,00
		Serial No.	177705	Unit	Grad -10,00	LSL	170,00
Char.Type	variable			Tolerance value	6 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 09.07.2021 16:04:19 to 09.07.2021 16:34:01

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.84 Nm; Cur-Cal: 0.0384 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.	GC0059l	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,99
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	4,78
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.84 Nm; Cu r-Cal: 0.0384 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}
177705	3000015-05	3,94	3,88	3,86	3,82	3,95	3,92	3,85	3,82	3,81	3,95
177705	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}
177705	3000015-05	3,92	3,86	3,78	3,83	3,96	3,95	3,82	3,83	3,92	3,79
177705	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}
177705	3000015-05	3,90	3,76	3,85	3,93	3,91	3,82	3,85	3,97	3,92	3,87
177705	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}
177705	3000015-05	3,75	3,85	3,96	3,89	3,85	3,80	3,87	3,94	3,93	3,88
177705	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}
177705	3000015-05	3,78	3,88	3,95	3,86	3,86	3,79	3,89	3,95	3,87	3,87
177705	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}
177705	3000015-05	3,78	3,88	3,89	3,86	3,81	3,87	3,96	3,92	3,88	3,81
177705	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}
177705	3000015-05	3,83	3,92	3,86	3,88	3,76	3,87	3,95	3,90	3,82	3,76
177705	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}
177705	3000015-05	3,82	3,94	3,90	3,85	3,75	3,88	3,95	3,82	3,82	3,78
177705	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

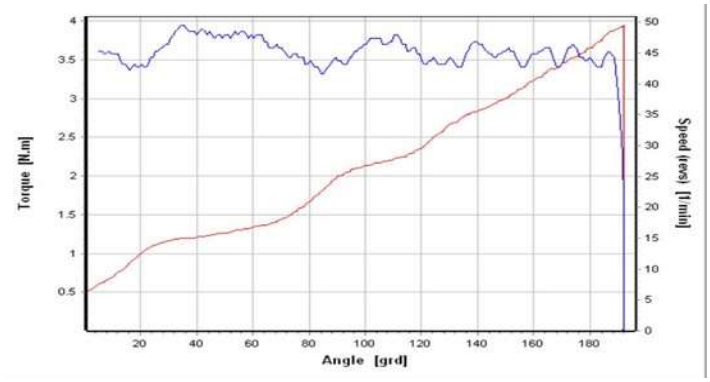
Ser.No.	GC0059l	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	1,99
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	4,78
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.84 Nm; Cu r-Cal: 0.0384 Nm/A; Speed: 100-50 RPM				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177705	3000015-05	3,86	3,94	3,92	3,86	3,89	3,98	3,93	3,89	3,83	3,92
177705	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

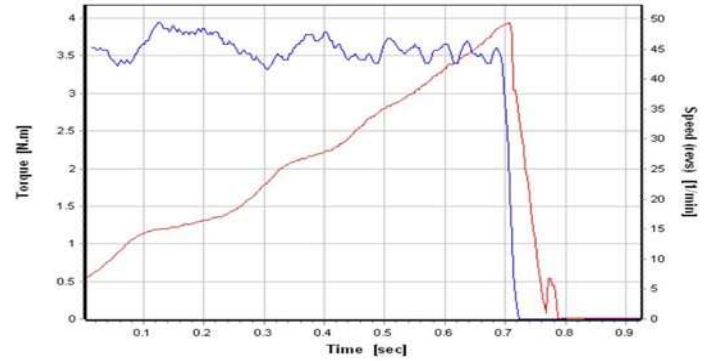
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	3,95	3,95	3,86	3,82	3,94	3,96	3,94	3,91	3,82	3,97
177705	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Torque graphs

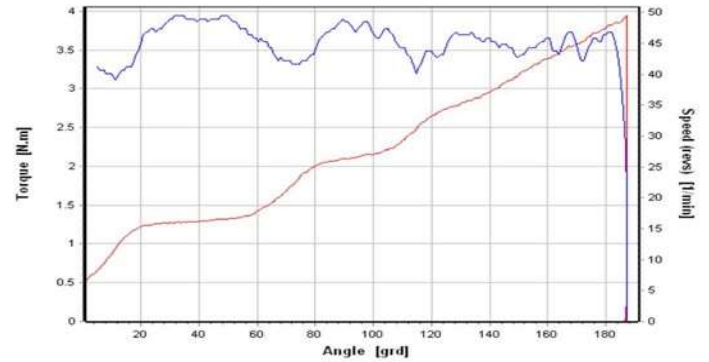
Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool without angle correction	



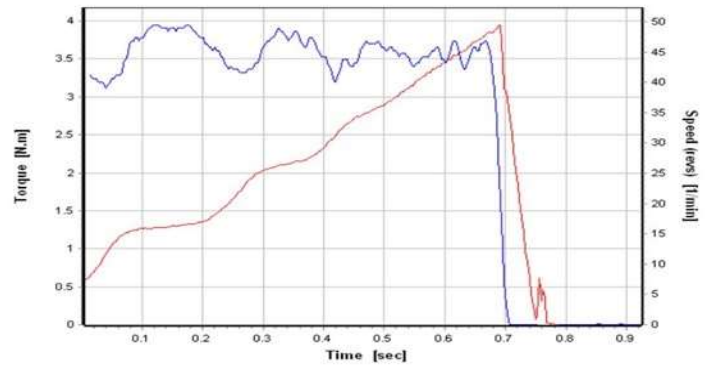
Value no. 1
Graph
Torque / Angle / Speed



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:** GC0059

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: 7.52 % ± **3.76 %**

Angle degree: 180° Tolerance: 7.0° ± **3.5°**

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

Tool with angle correction

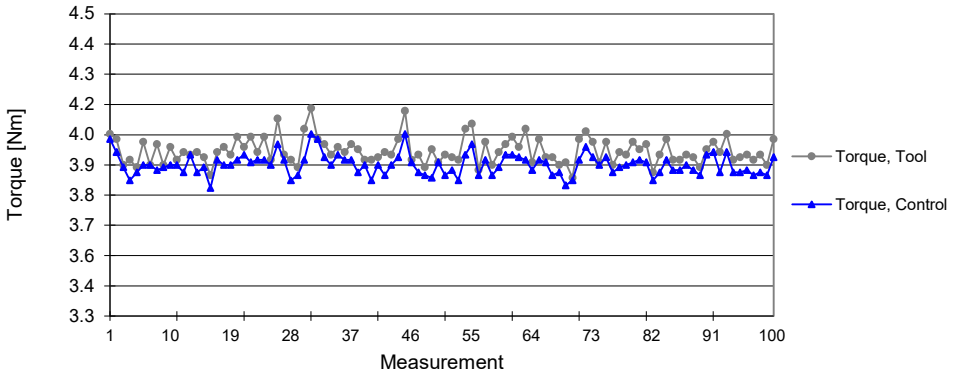
For measurements, the screwdriver must be held by hand and alternately moved.
In the column "Move +", the angle range in the screw direction,
In the column "Move -" of the direction opposite the direction of tightening,
within this range, the tool has to be moved.
Pay attention to changing angle values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

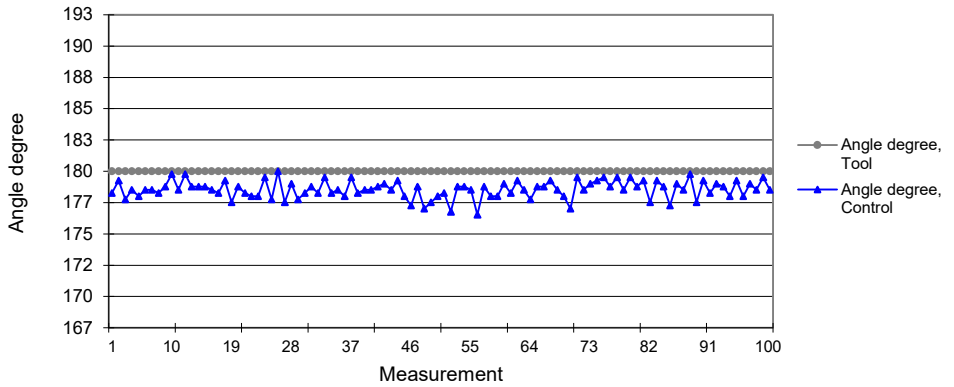
Move		Test conditions
+	-	0
0-25°	0-45°	Tool hand held

Measurement	Tool data		Control data		Difference	
No.	Torque	Angle	Torque	Angle	Torque	Angle
1	4.04	180.00	4.02	178.25	0.02	1.75
2	4.02	180.00	3.97	179.25	0.05	0.75
3	3.92	180.00	3.91	177.75	0.01	2.25
4	3.94	180.00	3.86	178.50	0.08	1.50
5	3.91	180.00	3.89	178.00	0.02	2.00
6	4.01	180.00	3.92	178.50	0.09	1.50
7	3.92	180.00	3.92	178.50	0.00	1.50
8	4.00	180.00	3.90	178.25	0.10	1.75
9	3.92	180.00	3.91	178.75	0.01	1.25
10	3.99	180.00	3.92	179.75	0.07	0.25
11	3.94	180.00	3.92	178.50	0.02	1.50
12	3.97	180.00	3.89	179.75	0.08	0.25
13	3.96	180.00	3.96	178.75	0.00	1.25
14	3.97	180.00	3.89	178.75	0.08	1.25
15	3.95	180.00	3.91	178.75	0.04	1.25
16	3.88	180.00	3.83	178.50	0.05	1.50
17	3.97	180.00	3.94	178.25	0.03	1.75
18	3.99	180.00	3.92	179.25	0.07	0.75
19	3.96	180.00	3.92	177.50	0.04	2.50
20	4.03	180.00	3.94	178.75	0.09	1.25
21	3.99	180.00	3.96	178.25	0.03	1.75
22	4.03	180.00	3.93	178.00	0.10	2.00
23	3.97	180.00	3.94	178.00	0.03	2.00
24	4.03	180.00	3.94	179.50	0.09	0.50
25	3.94	180.00	3.92	177.75	0.02	2.25
26	4.10	180.00	4.00	180.00	0.10	0.00
27	3.96	180.00	3.94	177.50	0.02	2.50
28	3.94	180.00	3.86	179.00	0.08	1.00
29	3.91	180.00	3.88	177.75	0.03	2.25
30	4.06	180.00	3.94	178.25	0.12	1.75
31	4.14	180.00	4.04	178.75	0.10	1.25
32	4.02	180.00	4.02	178.25	0.00	1.75
33	4.00	180.00	3.95	179.50	0.05	0.50
34	3.96	180.00	3.92	178.25	0.04	1.75
35	3.99	180.00	3.96	178.50	0.03	1.50
36	3.97	180.00	3.94	178.00	0.03	2.00
37	4.00	180.00	3.94	179.50	0.06	0.50
38	3.98	180.00	3.89	178.25	0.09	1.75
39	3.94	180.00	3.92	178.50	0.02	1.50
40	3.94	180.00	3.86	178.50	0.08	1.50
41	3.95	180.00	3.92	178.75	0.03	1.25
42	3.97	180.00	3.88	179.00	0.09	1.00
43	3.96	180.00	3.92	178.50	0.04	1.50
44	4.02	180.00	3.95	179.25	0.07	0.75
45	4.13	180.00	4.04	178.00	0.09	2.00
46	3.94	180.00	3.93	177.25	0.01	2.75
47	3.96	180.00	3.89	178.75	0.07	1.25
48	3.91	180.00	3.88	177.00	0.03	3.00
49	3.98	180.00	3.87	177.50	0.11	2.50
50	3.93	180.00	3.93	178.00	0.00	2.00
51	3.96	180.00	3.88	178.25	0.08	1.75
52	3.95	180.00	3.90	176.75	0.05	3.25
53	3.94	180.00	3.86	178.75	0.08	1.25
54	4.06	180.00	3.96	178.75	0.10	1.25
55	4.08	180.00	4.00	178.50	0.08	1.50
56	3.90	180.00	3.88	176.50	0.02	3.50
57	4.01	180.00	3.94	178.75	0.07	1.25
58	3.92	180.00	3.88	178.00	0.04	2.00
59	3.97	180.00	3.91	178.00	0.06	2.00
60	4.00	180.00	3.96	179.00	0.04	1.00
61	4.03	180.00	3.96	178.25	0.07	1.75
62	3.99	180.00	3.95	179.25	0.04	0.75
63	4.06	180.00	3.94	178.50	0.12	1.50
64	3.93	180.00	3.90	177.75	0.03	2.25
65	4.02	180.00	3.94	178.75	0.08	1.25
66	3.95	180.00	3.93	178.75	0.02	1.25
67	3.95	180.00	3.88	179.25	0.07	0.75
68	3.92	180.00	3.89	178.50	0.03	1.50
69	3.93	180.00	3.84	178.00	0.09	2.00
70	3.87	180.00	3.86	177.00	0.01	3.00
71	4.02	180.00	3.94	179.50	0.08	0.50
72	4.05	180.00	3.99	178.50	0.06	1.50
73	4.01	180.00	3.95	179.00	0.06	1.00
74	3.93	180.00	3.92	179.25	0.01	0.75
75	4.01	180.00	3.95	179.50	0.06	0.50
76	3.92	180.00	3.89	178.75	0.03	1.25
77	3.97	180.00	3.91	179.50	0.06	0.50
78	3.96	180.00	3.92	178.50	0.04	1.50
79	4.01	180.00	3.93	179.50	0.08	0.50
80	3.98	180.00	3.94	178.75	0.04	1.25
81	4.00	180.00	3.93	179.25	0.07	0.75
82	3.89	180.00	3.86	177.50	0.03	2.50
83	3.96	180.00	3.89	179.25	0.07	0.75
84	4.02	180.00	3.94	178.75	0.08	1.25
85	3.94	180.00	3.90	177.25	0.04	2.75
86	3.94	180.00	3.90	179.00	0.04	1.00
87	3.96	180.00	3.92	178.50	0.04	1.50
88	3.95	180.00	3.90	179.75	0.05	0.25
89	3.91	180.00	3.88	177.50	0.03	2.50
90	3.98	180.00	3.96	179.25	0.02	0.75
91	4.01	180.00	3.97	178.25	0.04	1.75
92	3.97	180.00	3.89	179.00	0.08	1.00
93	4.04	180.00	3.97	178.75	0.07	1.25
94	3.94	180.00	3.89	178.00	0.05	2.00
95	3.95	180.00	3.89	179.25	0.06	0.75
96	3.96	180.00	3.90	178.00	0.06	2.00
97	3.94	180.00	3.88	179.00	0.06	1.00
98	3.96	180.00	3.89	178.50	0.07	1.50
99	3.92	180.00	3.88	179.50	0.04	0.50
100	4.02	180.00	3.95	178.50	0.07	1.50
				Standard deviation:	**0.029**	**0.701**

Graphical representation

Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool with angle correction	





Machine Capability Study
Control System

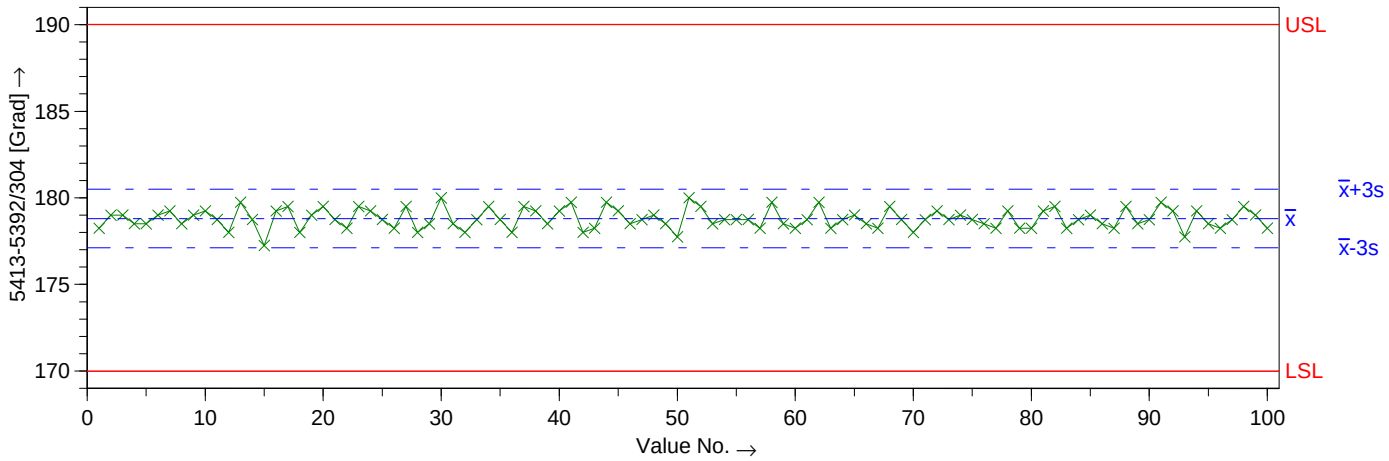
Page 1 / 1

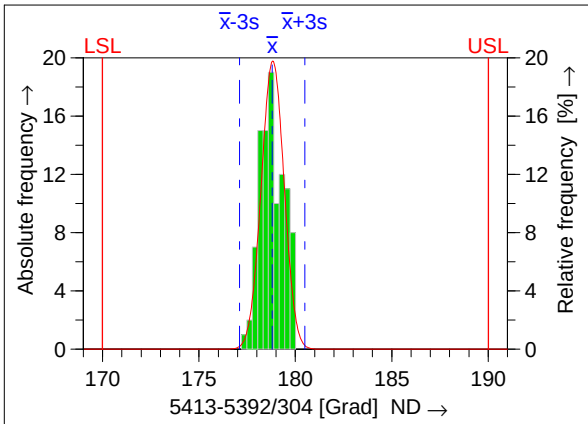
Plant	ATG Lexington	Operator Name	M. SHERMAN
Date	06.04.2021		

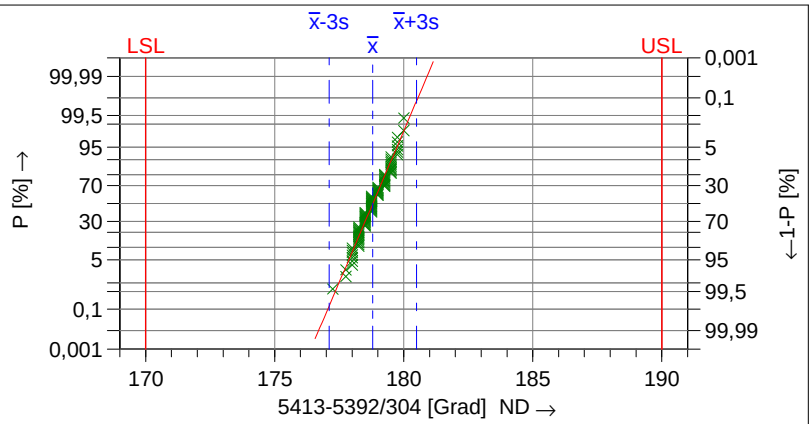
Ord. No.	CTBPW05Q	Part type	CTBPW05Q			Contr.item	yes
Serial No.	GC0059n	Char.Descr.	5413-5392/304	Inspection Val.	180,00 10,00	USL	190,00
		Serial No.	5376169	Unit	Grad -10,00	LSL	170,00
Char.Type	variable			Tolerance value	6 %	Decimal Pl.	2
Cust.Name	CLECO	Reference System	5413-5392/304	Test Electronic	MPRO400GCD-P		
Contr.No.	HOMOLOGATION	Reference Transducer	10/1023806	nges.	100		

Evaluation from 06.04.2021 03:25:04 to 06.04.2021 03:54:46

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.83 Nm; Cur-Cal: 0.0384 Nm/A; Speed: 100-50 RPM; with Gyroscope







Drawing Values		Collected Values		Statistics	
T_m	180.00			$\bar{x}$	178.8025
LSL	170.00	x_{min}	177.25	$\bar{x}$-3s	177.1093
USL	190.00	x_{max}	180.00	$\bar{x}$+3s	180.4957
T	20.00	R	2.75	6s	3.3864
		$n_{<T>}$	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	5.91
Critical capability index	=	C_{mk}	5.20

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 06.04.2021

Ser.No.	GC0059n	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,94
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,01
				USL	4,93
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.83 Nm; Cu r-Cal: 0.0384 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	3,95	4,04	3,83	3,84	4,03	3,98	3,79	3,96	4,01	3,82
5376169	5413-5392/304	178,25	179,00	179,00	178,50	178,50	179,00	179,25	178,50	179,00	179,25

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	3,89	4,00	3,92	3,83	3,92	3,98	3,83	3,91	4,00	3,82
5376169	5413-5392/304	178,75	178,00	179,75	178,75	177,25	179,25	179,50	178,00	179,00	179,50

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	3,82	3,96	3,97	3,80	3,93	3,99	3,80	3,86	4,00	3,94
5376169	5413-5392/304	178,75	178,25	179,50	179,25	178,75	178,25	179,50	178,00	178,50	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	3,79	3,93	4,00	3,82	3,81	3,98	3,98	3,79	3,93	4,02
5376169	5413-5392/304	178,50	178,00	178,75	179,50	178,75	178,00	179,50	179,25	178,50	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	3,82	3,81	3,97	4,00	3,79	3,91	4,02	3,84	3,83	3,99
5376169	5413-5392/304	179,75	178,00	178,25	179,75	179,25	178,50	178,75	179,00	178,50	177,75

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	3,96	3,83	3,94	4,01	3,78	3,87	3,99	3,93	3,77	3,97
5376169	5413-5392/304	180,00	179,50	178,50	178,75	178,75	178,75	178,25	179,75	178,50	178,25

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	3,95	3,82	3,88	4,03	3,89	3,82	3,99	3,94	3,80	3,92
5376169	5413-5392/304	178,75	179,75	178,25	178,75	179,00	178,50	178,25	179,50	178,75	178,00

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	3,98	3,79	3,85	4,00	3,81	3,87	3,98	3,93	3,80	3,95
5376169	5413-5392/304	178,75	179,25	178,75	179,00	178,75	178,50	178,25	179,25	178,25	178,25

Machine Capability Study
Control System

Plant	ATG Lexington		Operator Name	M. SHERMAN	Date 06.04.2021

Ser.No.	GC0059n	Characteristic			
Type	CTBPW05Q	Char.Descr.	5413-5392/304	Inspection Val.	3,94
Ord. No.	CTBPW05Q	Ser.No.	5376169	LSL	3,01
				USL	4,93
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.83 Nm; Cu r-Cal: 0.0384 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	3,99	3,80	3,89	4,01	3,80	3,82	3,99	3,91	3,78	4,00
5376169	5413-5392/304	179,25	179,50	178,25	178,75	179,00	178,50	178,25	179,50	178,50	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	3,94	3,78	3,91	3,97	3,78	3,83	4,01	3,99	3,79	3,94
5376169	5413-5392/304	179,75	179,25	177,75	179,25	178,50	178,25	178,75	179,50	179,00	178,25

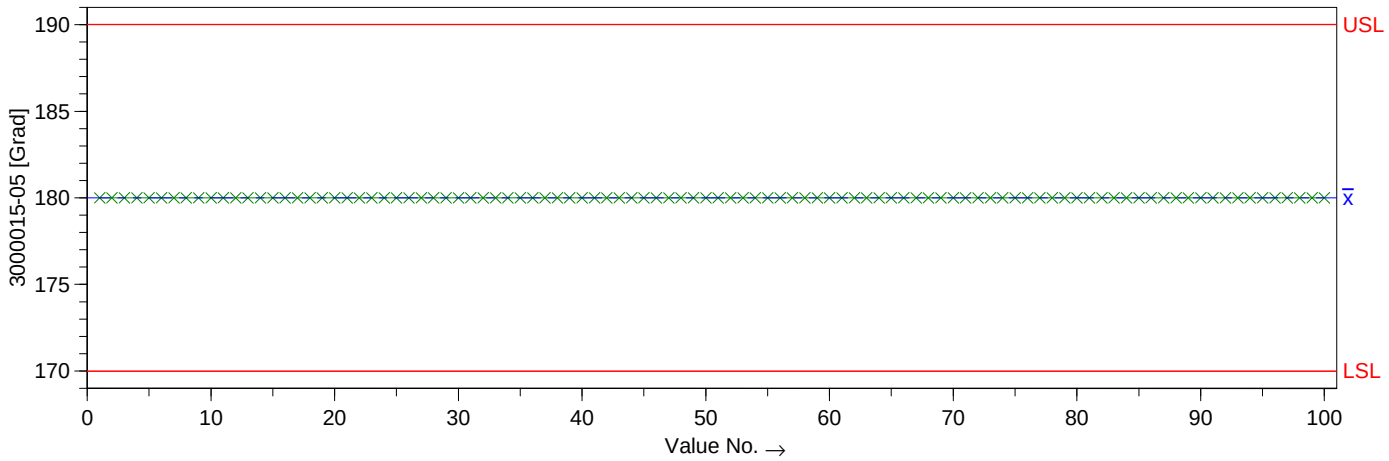
Machine Capability Study
Tool System

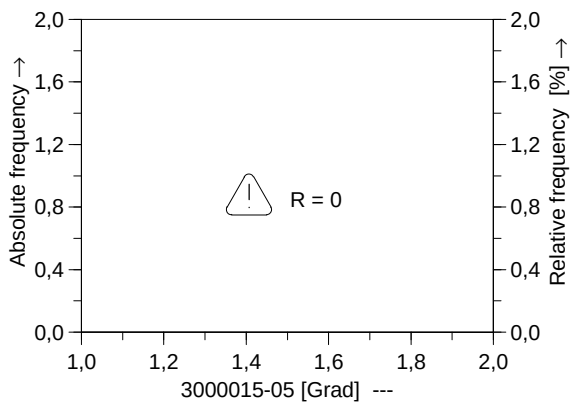
Plant ATG Lexington		Operator Name M. SHERMAN	Date 06.04.2021

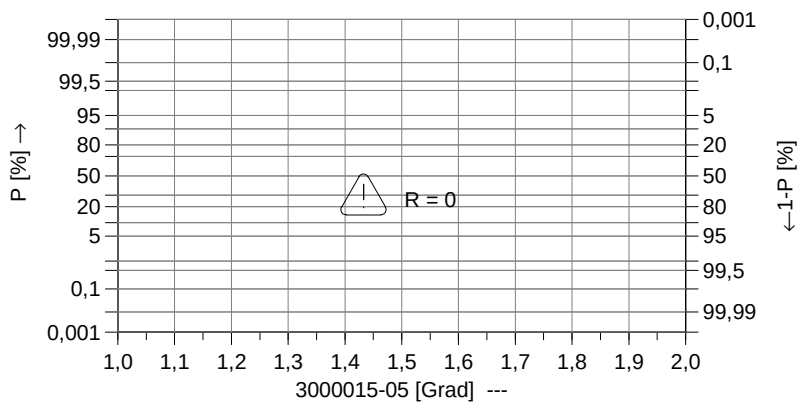
Ord. No. CTBPW05Q	Part type CTBPW05Q				Contr.item yes
Serial No. GC0059n	Char.Descr. 3000015-05	Inspection Val. 180,00	10,00	USL 190,00	
	Serial No. 177705	Unit Grad	-10,00	LSL 170,00	
Char.Type variable		Tolerance value 6 %		Decimal Pl. 2	
Cust.Name CLECO	Reference System 5413-5392/304	Test Electronic MPRO400GCD-P			
Contr.No. HOMOLOGATION	Reference Transducer 10/1023806	nges. 100			

Evaluation from 06.04.2021 15:25:02 to 06.04.2021 15:54:44

Rem. TQ 80% angle 180 +/-10° * TQ-Cal: 5.83 Nm; Cur-Cal: 0.0384 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 06.04.2021

Ser.No.	GC0059n	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,06
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	4,93
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.83 Nm; Cu r-Cal: 0.0384 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}
177705	3000015-05	3,96	4,02	3,85	3,85	4,03	3,98	3,80	3,92	3,99	3,80
177705	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}
177705	3000015-05	3,87	3,97	3,94	3,84	3,90	3,97	3,83	3,92	3,99	3,83
177705	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}
177705	3000015-05	3,85	3,95	3,95	3,81	3,93	3,98	3,82	3,87	4,00	3,94
177705	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}
177705	3000015-05	3,78	3,92	3,98	3,85	3,85	3,96	3,99	3,81	3,93	4,01
177705	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}
177705	3000015-05	3,82	3,81	3,97	3,99	3,81	3,89	3,98	3,84	3,82	3,97
177705	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}
177705	3000015-05	3,93	3,85	3,94	3,98	3,79	3,86	3,99	3,94	3,77	3,94
177705	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}
177705	3000015-05	3,93	3,83	3,89	4,01	3,89	3,83	3,98	3,94	3,81	3,89
177705	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}
177705	3000015-05	3,96	3,79	3,85	3,99	3,83	3,87	3,95	3,91	3,80	3,93
177705	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 06.04.2021

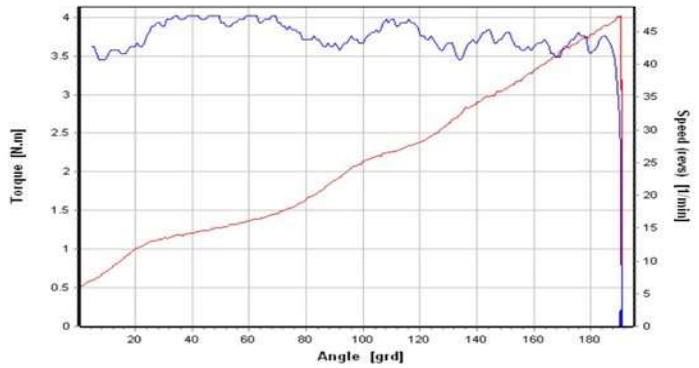
Ser.No.	GC0059n	Characteristic			
Type	CTBPW05Q	Char.Descr.	3000015-05	Inspection Val.	2,06
Ord. No.	CTBPW05Q	Ser.No.	177705	LSL	0,00
				USL	4,93
Remark	TQ 80% angle 180 +/-10°* TQ-Cal: 5.83 Nm; Cu r-Cal: 0.0384 Nm/A; Speed: 100-50 RPM; with Gyroscope				

Char.No	Char.Descr.	x_{81}	x_{82}	x_{83}	x_{84}	x_{85}	x_{86}	x_{87}	x_{88}	x_{89}	x_{90}
177705	3000015-05	4,01	3,82	3,89	4,01	3,79	3,84	3,98	3,90	3,80	3,97
177705	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

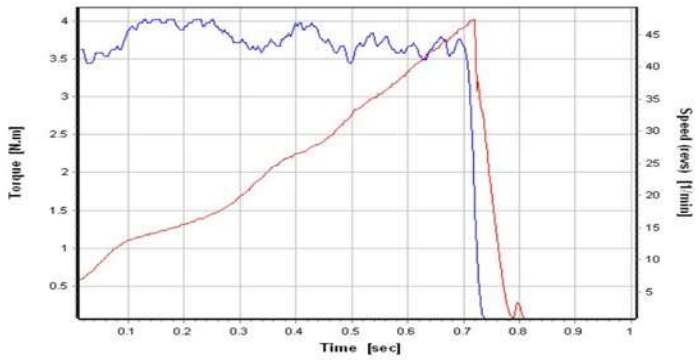
Char.No	Char.Descr.	x_{91}	x_{92}	x_{93}	x_{94}	x_{95}	x_{96}	x_{97}	x_{98}	x_{99}	x_{100}
177705	3000015-05	3,92	3,79	3,88	3,95	3,80	3,84	4,01	3,96	3,79	3,95
177705	3000015-05	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00	180,00

Torque graphs

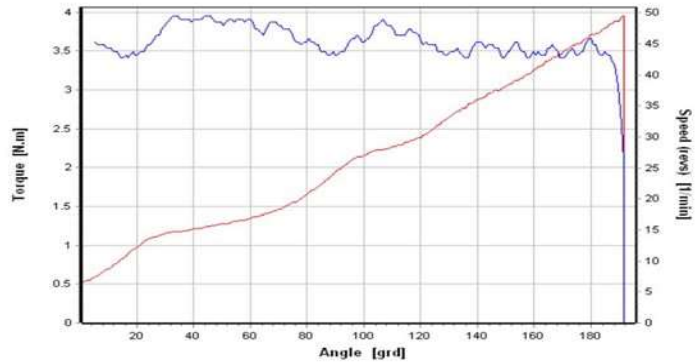
Model:	**CTBPW05Q**	Serial no:	**GC0059**
Target torque:	**3.92 Nm**	80 % of max. torque	
Angle degree:	**180°**	Tool with angle correction	



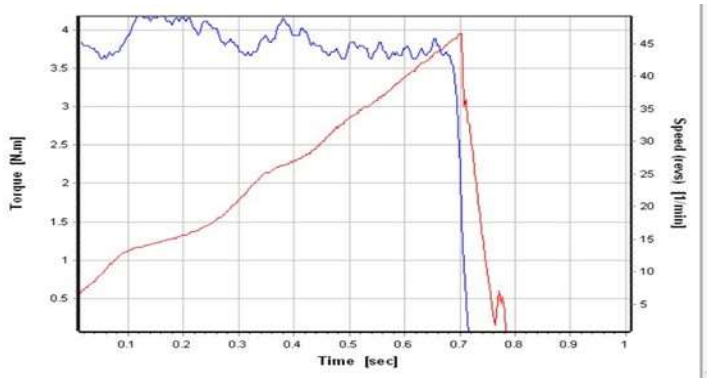
Value no. 1
Graph
Torque / Angle / Speed



Value no. 1
Graph
Torque / Time / Speed



Value no. 100
Graph
Torque / Angle / Speed



Value no. 100
Graph
Torque / Time / Speed