

Parts Manual
PL12EN-18ES
09/08/2015

Cleco®

18ES Series
Electronically Controlled Inline Nutrunner



For additional product information visit our website at <http://www.apextoolgroup.com>

“A”

18	E	S	X	XX	XX	X
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Tool Series

18

Motor Style

E = Brushless Electric Motor

Tool Type

S = Inline

Feature

- = Matrix Tool Connector (Standard)

E = Air LB Connector

Maximum Torque Nm (rounded to nearest Nm)

06 = 6 Nm

12 = 12 Nm

17 = 17 Nm

22 = 22 Nm

31 = 31 Nm

Attachment

Q = 1/4" Hex Slip Chuck (06, 12, 17)

D2 = 1/4" Square Drive (06)

D3 = 3/8" Square Drive (12, 17, 22, 31)

Spindle Type

- = Pin Retainer (Standard)

B = Ball Retainer

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18ES(E) Series Technical Data

PL12EN-18ES
09/08/2015

18ES Series Specifications - Matrix Tool Connector

Model Number	Tool Range				Max. Speed (rpm)	Length		Weight		Side to Center		Ouput Drive Size
	Max Tq		Min Tq			in	mm	lbs	kg	in	mm	
	ft-lb	Nm	ft-lb	Nm								
18ES06Q	1.5	2	4.4	6	4000	12.3	312	2.5	1.1	0.91	23	1/4" Hex
18ES06D2(B)	1.5	2	4.4	6	4000	11.8	300	2.5	1.1	0.91	23	1/4" Square
18ES12Q	2.2	3	8.9	12	1820	13.0	330	2.7	1.2	0.91	23	1/4" Hex
18ES12D3(B)	2.2	3	8.9	12	1820	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ES17Q	3.0	4	12.5	17	1290	13.0	330	2.7	1.2	0.91	23	1/4" Hex
18ES17D3(B)	3.0	4	12.5	17	1290	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ES22D3(B)	3.7	5	16.2	22	985	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ES31D3(B)	5.2	7	22.9	31	695	12.4	315	2.7	1.2	0.91	23	3/8" Square

18ES Series Tool Memory Parameters - Matrix Tool Connector

Model Number	Max Speed [RPM]	Max Torque [Nm]	Torque Cal [Nm]	Transducer Type	Angle Cal [PPD]	Static Current Factor [Nm/A]
18ES06Q	4000	6	6.9796	542846-06	21.3333	0.5315
18ES06D2(B)	4000	6	6.9796	542846-06	21.3333	0.5315
18ES12Q	1820	12	12.8653	542846-12	46.8595	1.1091
18ES12D3(B)	1820	12	12.8653	542846-12	46.8595	1.1091
18ES17Q	1290	17	17.8509	542846-17	66.1219	1.5651
18ES17D3(B)	1290	17	17.8509	542846-17	66.1219	1.5651
18ES22D3(B)	985	22	32.1710	542846-31	86.5882	2.0495
18ES31D3(B)	695	31	31.8208	542846-31	122.1818	2.8920

18ESE Series Specifications - Air LB Tool Connector

Model Number	Tool Range				Max. Speed (rpm)	Length		Weight		Side to Center		Ouput Drive Size
	Max Tq		Min Tq			in	mm	lbs	kg	in	mm	
	ft-lb	Nm	ft-lb	Nm								
18ESE06Q	1.5	2	4.4	6	4000	12.3	312	2.5	1.1	0.91	23	1/4" Hex
18ESE06D2(B)	1.5	2	4.4	6	4000	11.8	300	2.5	1.1	0.91	23	1/4" Square
18ESE12Q	2.2	3	8.9	12	1820	13.0	330	2.7	1.2	0.91	23	1/4" Hex
18ESE12D3(B)	2.2	3	8.9	12	1820	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ESE17Q	3.0	4	12.5	17	1290	13.0	330	2.7	1.2	0.91	23	1/4" Hex
18ESE17D3(B)	3.0	4	12.5	17	1290	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ESE22D3(B)	3.7	5	16.2	22	985	12.4	315	2.7	1.2	0.91	23	3/8" Square
18ESE31D3(B)	5.2	7	22.9	31	695	12.4	315	2.7	1.2	0.91	23	3/8" Square

18ESE Series Tool Memory Parameters - Air LB Tool Connector

Model Number	Max Speed [RPM]	Max Torque [Nm]	Torque Cal [Nm]	Transducer Type	Angle Cal [PPD]	Static Current Factor [Nm/A]
18ESE06Q	4000	6	6.9796	542846-06	21.3333	0.5315
18ESE06D2(B)	4000	6	6.9796	542846-06	21.3333	0.5315
18ESE12Q	1820	12	12.8653	542846-12	46.8595	1.1091
18ESE12D3(B)	1820	12	12.8653	542846-12	46.8595	1.1091
18ESE17Q	1290	17	17.8509	542846-17	66.1219	1.5651
18ESE17D3(B)	1290	17	17.8509	542846-17	66.1219	1.5651
18ESE22D3(B)	985	22	32.1710	542846-31	86.5882	2.0495
18ESE31D3(B)	695	31	31.8208	542846-31	122.1818	2.8920

The original language of this manual is English.

Product Safety Information:

Intended Use:

These DC electric tools are intended for tightening of threaded joints or running down fasteners. Use only for their designated purpose. Do not use in any improper manner that could cause damage to the tool or injure the operator.

For additional product safety information refer to Apex Tool Group, LLC or Apex Tool Group GmbH & Co. OHG document CE-2002, General Safety Instructions Electric Assembly Tools.



These DC electric assembly tools must not be modified in any manner unless approved in writing by Apex Tool Group, LLC or Apex Tool Group GmbH & Co. OHG. All safety devices must be properly installed and maintained in good working order. Abuse, misuse, or failure to obey this and any other issued warnings may result in injury or death.

EC Declaration of Conformity:

We affirm that the product specified herein is to be considered a machine in conjunction with a fastening control from Apex Tool Group. We further declare that this machine is in accordance with the following EC Regulations, 2006/42/EC and 2014/30/EC. Applied harmonized standards are ISO 12100:2010-11.

The name, job function and address of the person authorized to compile the technical file.

Mr. Vishnu Irigireddy
Director of Global R&D- Mechanical Engineering
Apex Tool Group
670 Industrial Drive
Lexington, SC 29072

I. V. Vishnu Varadhan

Signature: Vishnu Irigireddy
Date: September 04, 2015

Noise and Vibration:

18ES Series: Noise Level ≤ 68 dB(A)
18ESE Series: Noise Level ≤ 68 dB(A)

18ES Series: Vibration < 2.5 m/s²
18ESE Series: Vibration < 2.5 m/s²

Service and Repair:

Tool service and repair should be performed by an authorized Apex Tool Group, LLC or Apex Tool Group GmbH & Co. OHG Center. Refer to the last page of this manual for locations.

Disposal:



Observe local disposal guidelines for all components of this tool and its packaging.

Copyright Protection:

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Gearing and angle head grease:

For proper function and long service life, use of the correct grease is essential.

Part No.	Packaged	Designation
544076	2 oz. (0.06 kg)	Molytex EP2
544077	16 oz. (0.45 kg)	Molytex EP2
541444	2 oz. (0.06 kg)	Rheolube 363AX-1
541445	16 oz. (0.45 kg)	Rheolube 363AX-1

“B”

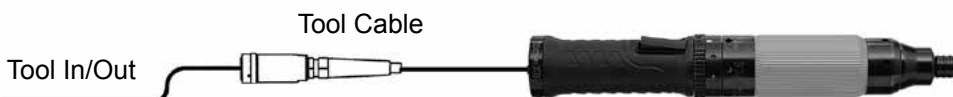
m-Pro-400 Series
Controller



TME-200 Series
Controller



Complete Tool Matrix Connector Order Number	Complete Tool Air LB Connector Order Number
18ES06Q	18ESE06Q
18ES06D2(B)	18ESE06D2(B)
18ES12Q	18ESE12Q
18ES12D3(B)	18ESE12D3(B)
18ES17Q	18ESE17Q
18ES17D3(B)	18ESE17D3(B)
18ES22D3(B)	18ESE22D3(B)
18ES31D3(B)	18ESE31D3(B)



m-Pro-400GC
Global Controller



m-Pro-400-IT
Isolation Transformer
(18ES Models)



Tool Cable

Tool Cable

18ESE Models



TME and m-Pro-400 Series Controllers

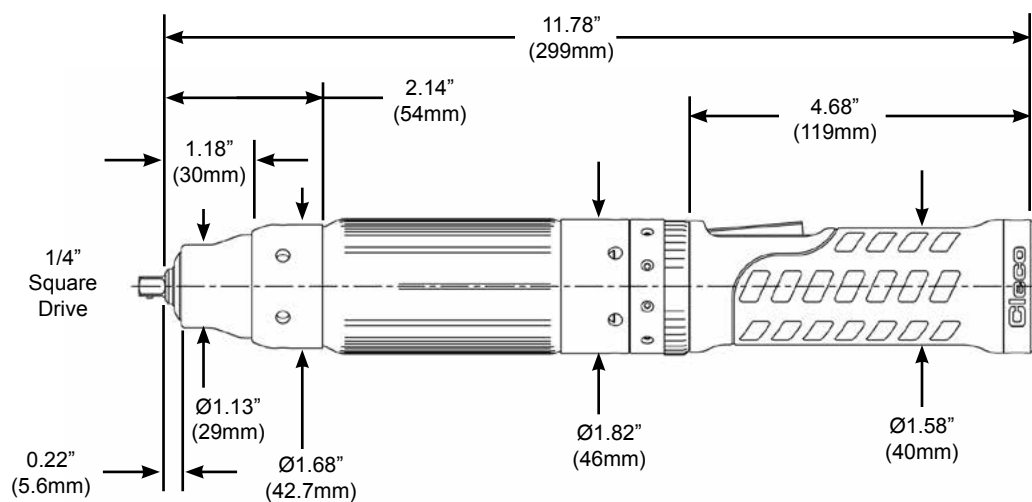
18ES	18ESE	EN Description
115 VAC	Standard	TMEI-114-15-U
115 VAC	DeviceNet	TMEI-114-15-U-ED
115 VAC	Profibus	TMEI-114-15-U-EP
TME-200	m-Pro-400	Controller
PL12()-1300	*	Programming Notes
575708	*	Battery
541683-01	*	Power Cord: 115VAC - USA
541683-02	*	Power Cord: 230VAC - USA
541683-03	*	Power Cord: 230VAC - Europe
542779-XXX	301877-XXX	Extension Cable
544056-XXX	301904-XXX	Swivel Cable
544055-XXX	301903-XXX	Swivel Cable - Right Angle
542778-XXX	301866-XXX	Tool Cable

* Note: Contact Apex Tool Group

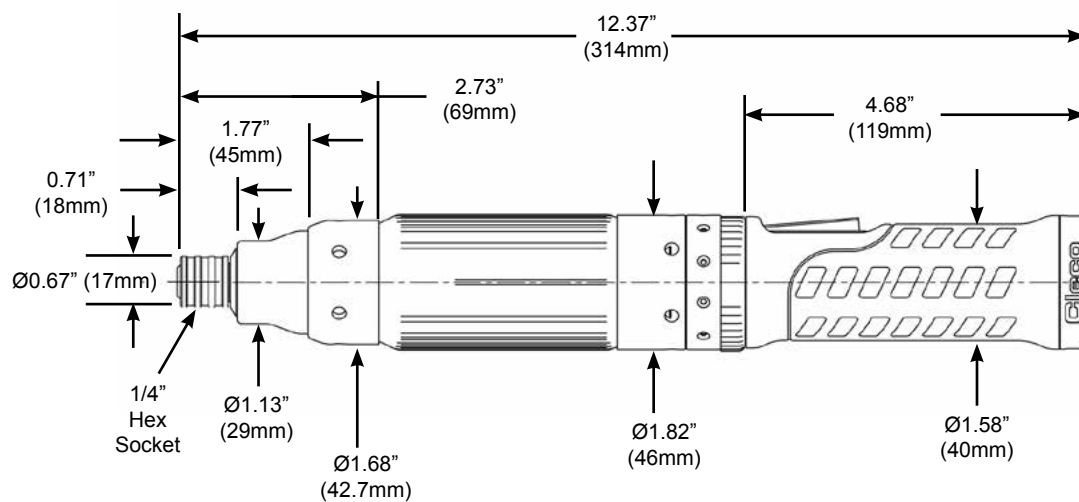
TME-200 Series Controller

Supply Voltage	EN Order Number
115 VAC	TME-211-15-U
115 VAC	TME-221-15-U
230 VAC	TME-211-30-U
230 VAC	TME-221-30-U

“C1”



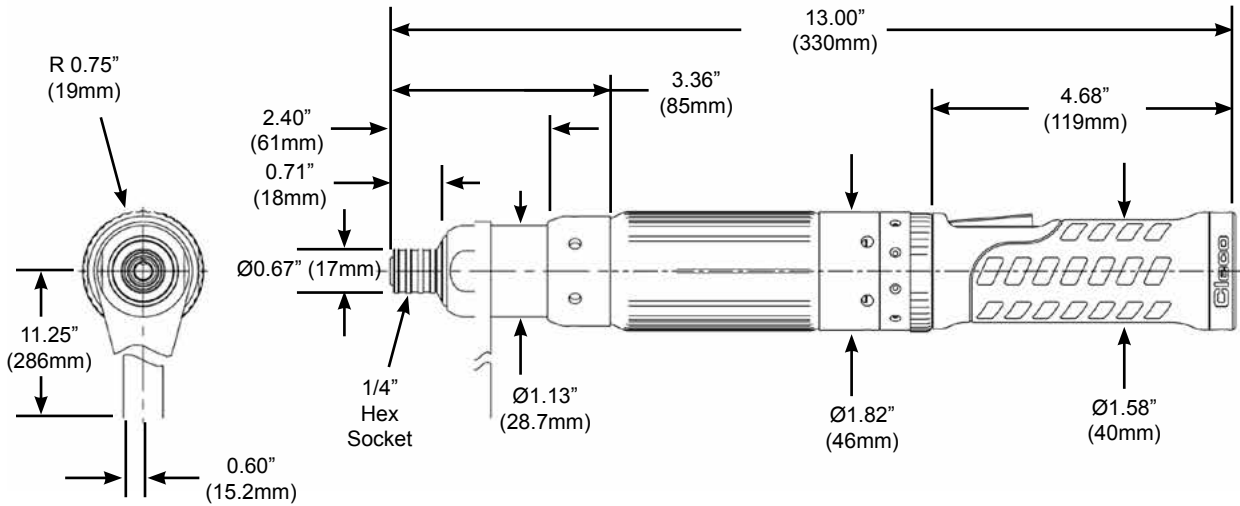
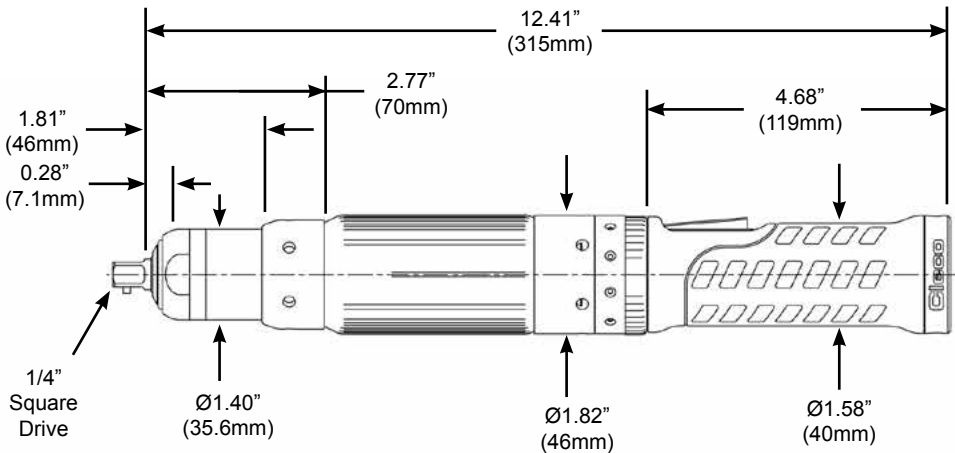
18ES(E)06D2(B)
(Pin Lock Shown)



18ES(E)06Q

“C2”

18ES(E)12D3(B) 18ES(E)22D3(B)
18ES(E)17D3(B) 18ES(E)31D3(B)
(Pin Lock Shown)



18ES(E)12Q
18ES(E)17Q

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Troubleshooting

Malfunction	Possible causes	Remedy
Tool does not start	Start switch faulty	→ Replace start switch
	No speed (RPM) programmed	→ Program a speed for all active stages
	Controller is waiting for a Tool Enable	→ Make the Tool Enable connection or disable Tool Enable if not required
	Faulty cable	→ Replace or repair cable
	Bent pins in cable or tool	→ Straighten pins or replace faulty connector
Tool runs forward but not Reverse	No speed programmed for Reverse	→ Enter a speed (RPM) for Reverse
	Faulty reverse switch	→ Replace Start/Reverse switch assembly
	Faulty cable	→ Replace or repair cable
	Bent pins in cable or tool	→ Straighten pins or replace faulty connector
Tool shuts off at desired torque but reports no angle	Angle Threshold value is set to high	→ Correct fastening strategy programming to include a low Angle threshold value
Tool shuts off prematurely	Operator is releasing the start switch before the controller stops the tool	→ Verify that the operator is keeping the start switch depressed through the entire rundown
	Rundown time exceeds the default time value of 10 seconds	→ Increase the rundown timer to exceed the rundown time required
	Tool has reached Angle High Limit before reaching the Torque target	→ Check the fastening strategy programming to verify that the Torque target and Angle High Limit are correct. If the parameters are correct, see if something has changed in the assembly that would cause an incorrect torque/angle relationship.
Tool won't change speeds	Speeds are the same in all applicable stages	→ Verify that all speeds and shift points are correct in the stages that are being used.
All the lights on the tool begin flashing when the reverse collar/switch is put in reverse	This is a normal function as set by the default parameters. If the lights are not flashing when the tool is in reverse the "Blinking Lights in Reverse" check box is not selected.	→ Check selections in the ADVANCED menu, Tool Settings tab.
Warning message in the RUN screen reports "Transducer Offset Error"	The tool transducer is not returning to a zero torque condition	→ Transducer has been over-stressed and needs replacement
	Faulty wiring in tool or cable	→ Check tool with different cable to see if the condition remains. Transducer offset and full scale voltages can be seen in the DIAGNOSTICS menu.
"Tool Not Connected" message appears in the RUN screen	Tool has not been accepted in the TOOL SETUP screen	→ Verify that the tool has been accepted in the TOOL SETUP screen. Before accepting the tool, the message "Needs User Acceptance" should appear in the tool overview screen. Verify that the correct tool is highlighted when going to Tool Settings to accept the tool.
	Faulty cable is preventing the tool from being "seen" by the controller	→ Replace or repair cable
Torque reported by the controller doesn't match the torque reported by an external transducer	Torque calibration factor in Tool Settings in the TOOL SETUP menu needs to be adjusted	→ Adjust torque calibration factor using the formula below: New Cal Factor = (External Reading/Tool Reading) x Existing Torque Calibration Factor
	Custom head has been added to the tool and the tool needs updated tool memory information	→ Tool memory must be programmed to accommodate new attachment
Tool cable will not fit in tool handle	Wrong cable. Tools used with Global Controller utilize an Air-Ib connector, which has a smaller ID housing in the tool than previous Matrix style connector housings.	→ Utilize the correct cable for the tool being used.

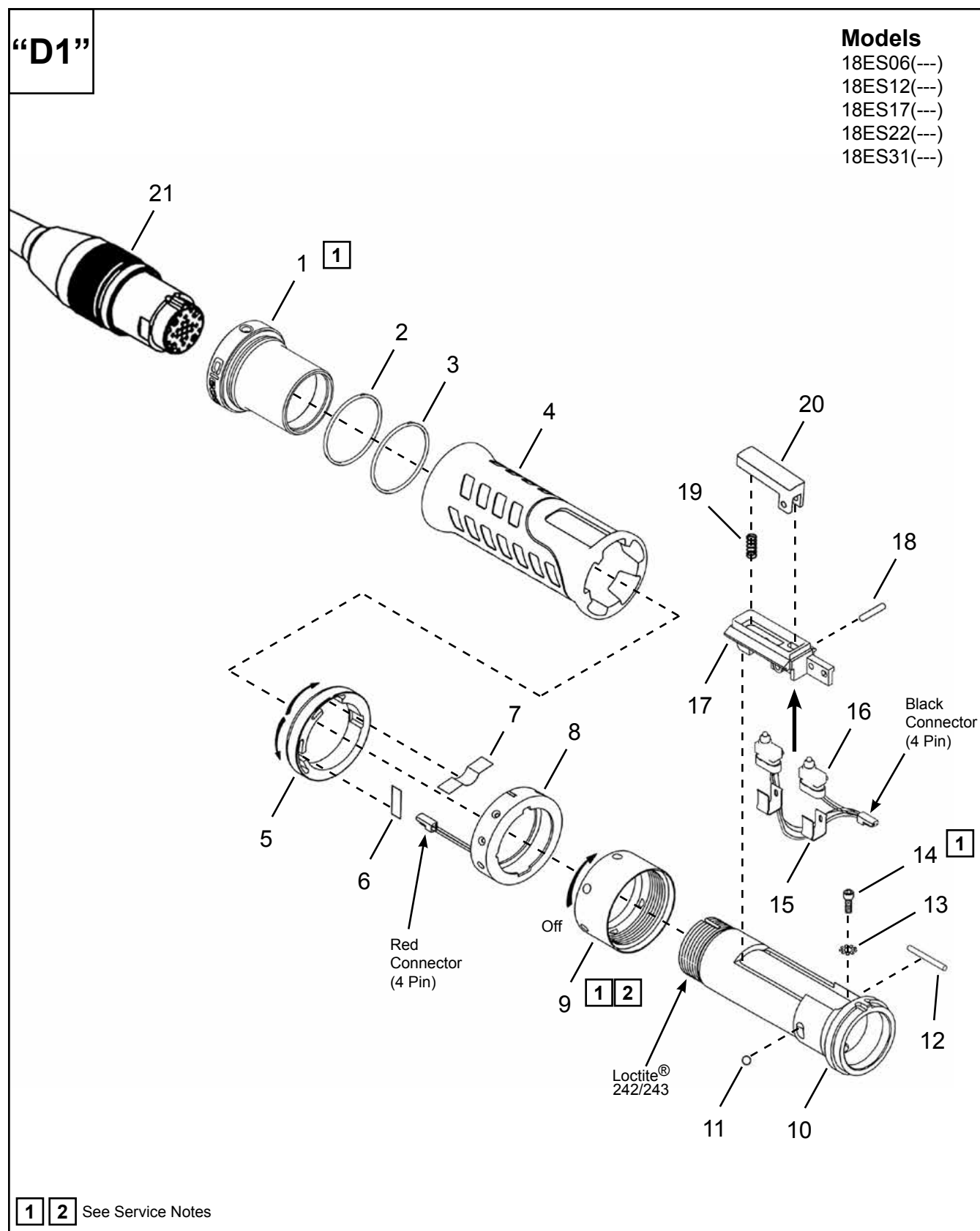
Maintenance:



Only qualified and trained personnel are to perform maintenance on these tools.

Regular maintenance reduces operating faults, repair costs and downtime. In addition to the following service schedule, implement a safety related maintenance program that takes the local regulations for repair and maintenance for all operating phases of the tool into account.

Maintenance Interval	Rundowns	Designation
Daily	Daily	→ Visual inspection of all cables and connections → Visual inspection of the 18ES tool → Check the tool for excessive vibration or unusual noises → Visual inspection of all external components of the tool
Approximately	100,000	→ Inspect the tool cable for damage or wear → inspect the output spindle for damage or wear → Inspect the tool cable connection for a secure fit → Check the maximum free speed
Approximately	500,000	→ Visual inspection of disassembled 18ES tool → Check individual parts for wear or damage and replace if necessary → Clean and lubricate gearing and motor bearings → Check and recalibrate transducer
Approximately	1,000,000	→ Visual inspection of disassembled 18ES tool → Check individual parts for wear or damage and replace if necessary → Clean and lubricate gearing and motor bearings → Check and recalibrate transducer



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Handle - Matrix Tool Connector

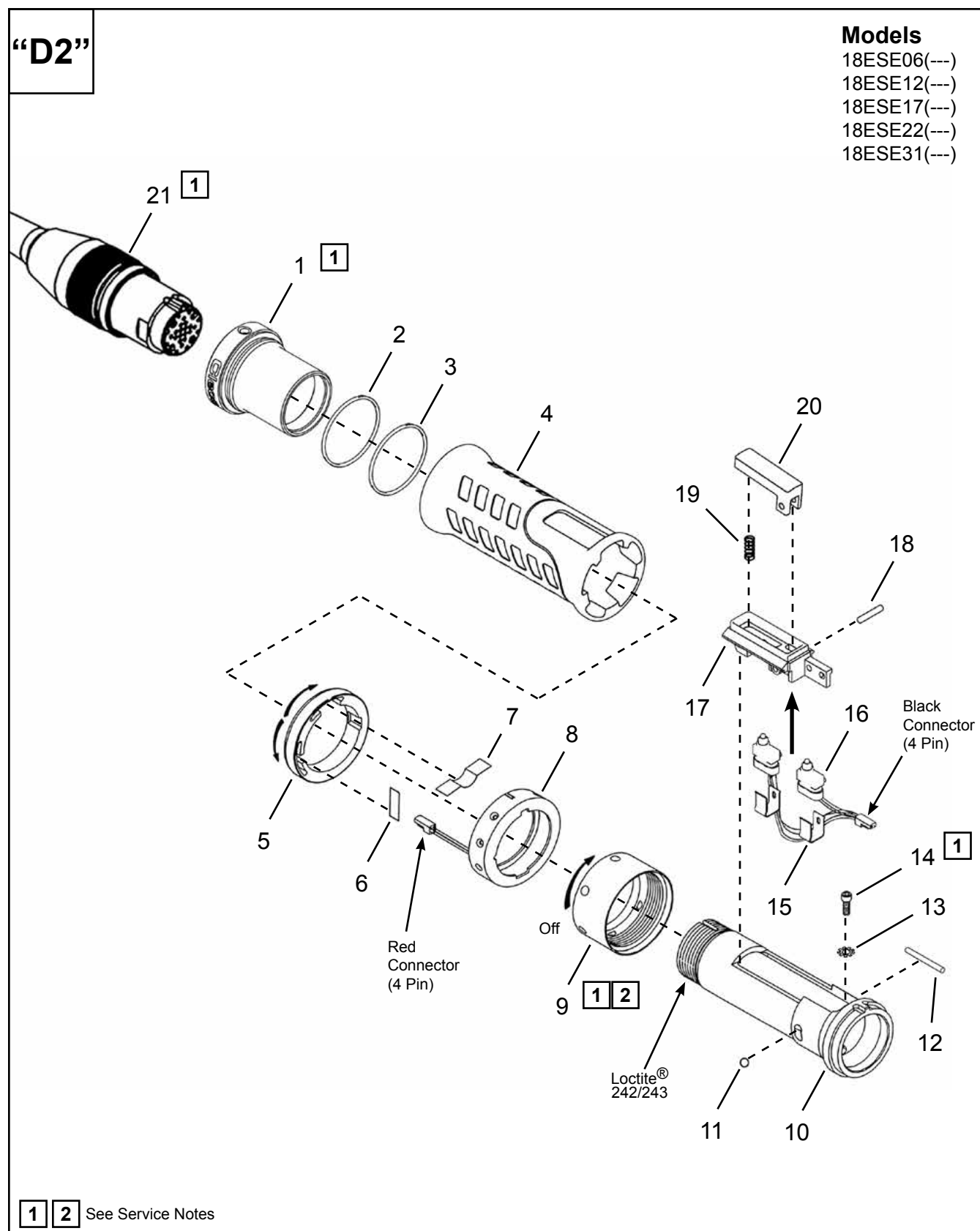
PL12EN-18ES
09/08/2015

Illustration "D1"

Ref	Number	#	X	EN
				Description
1	207325	1		Connector Sleeve
2	524818	1	3	O-Ring
3	22598	1	3	O-Ring
4	207323	1		Handle Sleeve
5	542938	1		Reverse Ring
6	541624	1	2	Forward/Reverse Spring
7	541033	1	2	Reverse Spring
8	542819	1		Light Ring Assembly
9	541017	1		Handle Retainer Nut
10	541015	1		Handle
11	1091PT	1	3	Steel Ball - 3/16"
12	1009089	1	3	Housing Pin
13	W115	1	3	Lock Washer
14	B159V	1	3	Cap Screw - #6-32
15	207317	2	2	Switch Spring Clip
16	F900571	1	2	Start/Reverse Switch
17	207316	1		Switch Holder
18	541840	1	3	Switch Pin
19	266255	1	3	Switch Spring
20	F900185	1		Switch Actuator
Tool Cable (Optional Length)				
21	542778-1M	1		1 meter cable
	542778-2M			2 meter cable
	542778-3M			3 meter cable
	542778-6M			6 meter cable
	542778-8M			8 meter cable
	542778-10M			10 meter cable
	542778-15M			15 meter cable
Inline Swivel Cable (Optional Length)				
21	544056-1M	1		1 meter cable
	544056-2M			2 meter cable
	544056-3M			3 meter cable
	544056-6M			6 meter cable
	544056-8M			8 meter cable
	544056-10M			10 meter cable
	544056-15M			15 meter cable
Angle Swivel Cable (Optional Length)				
21	544055-1M	1		1 meter cable
	544055-2M			2 meter cable
	544055-3M			3 meter cable
	544055-6M			6 meter cable
	544055-8M			8 meter cable
	544055-10M			10 meter cable
	544055-15M			15 meter cable
Tool Cable Extension (Optional Length)				
21	542779-1M	1		1 meter cable
	542779-2M			2 meter cable
	542779-3M			3 meter cable
	542779-6M			6 meter cable
	542779-10M			10 meter cable
	542779-15M			15 meter cable
	542779-50M			50 meter cable

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)



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Handle - Air LB Tool Connector

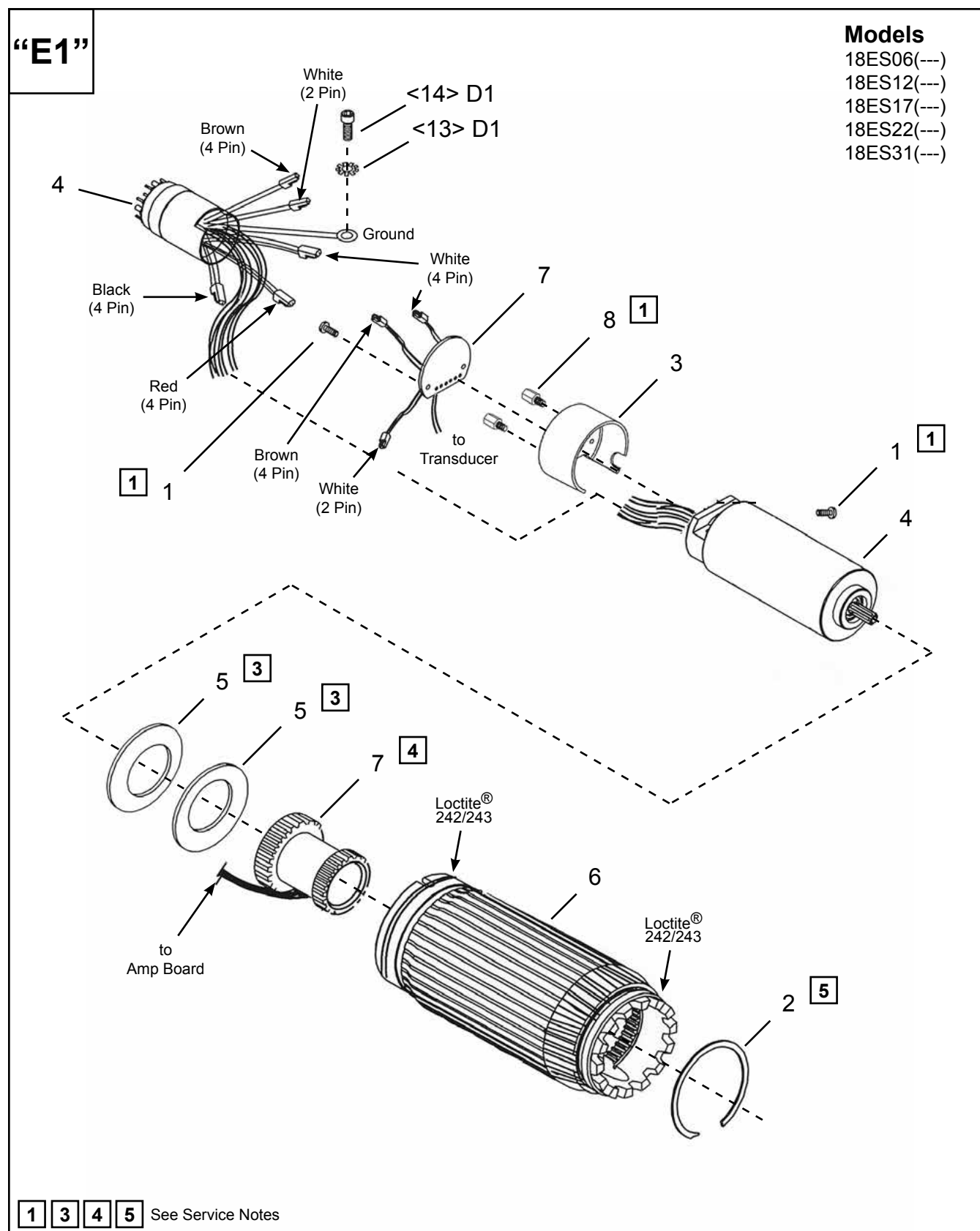
PL12EN-18ES
09/08/2015

Illustration "D2"

Ref	Number	#	X	EN
				Description
1	207325E	1		Connector Sleeve
2	524818	1	3	O-Ring
3	22598	1	3	O-Ring
4	207323	1		Handle Sleeve
5	542938	1		Reverse Ring
6	541624	1	2	Forward/Reverse Spring
7	541033	1	2	Reverse Spring
8	542819	1		Light Ring Assembly
9	541017	1		Handle Retainer Nut
10	207322	1		Handle
11	1091PT	1	3	Steel Ball - 3/16"
12	1009089	1	3	Housing Pin
13	W115	1	3	Lock Washer
14	B159V	1	3	Cap Screw - #6-32
15	207317	2	2	Switch Spring Clip
16	F900571	1	2	Start/Reverse Switch
17	207316	1		Switch Holder
18	541840	1	3	Switch Pin
19	266255	1	3	Switch Spring
20	F900185	1		Switch Actuator
Tool Cable (Optional Length)				
21	301866-2M	1		2 meter cable
	301866-3M			3 meter cable
	301866-4M			4 meter cable
	301866-6M			6 meter cable
	301866-8M			8 meter cable
	301866-10M			10 meter cable
	301866-15M			15 meter cable
Inline Swivel Cable (Optional Length)				
21	301904-2M	1		2 meter cable
	301904-3M			3 meter cable
	301904-8M			8 meter cable
	301904-15M			15 meter cable
Angle Swivel Cable (Optional Length)				
21	301903-2M	1		2 meter cable
	301903-3M			3 meter cable
	301903-8M			8 meter cable
	301903-15M			15 meter cable
Tool Cable Extension (Optional Length)				
21	301877-4M	1		4 meter cable
	301877-8M			8 meter cable
	301877-10M			10 meter cable
	301877-20M			20 meter cable
	301877-30M			30 meter cable
	301877-40M			40 meter cable
	301877-50M			50 meter cable

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)



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Motor - Matrix Tool Connector

PL12EN-18ES
09/08/2015

Illustration "E1"

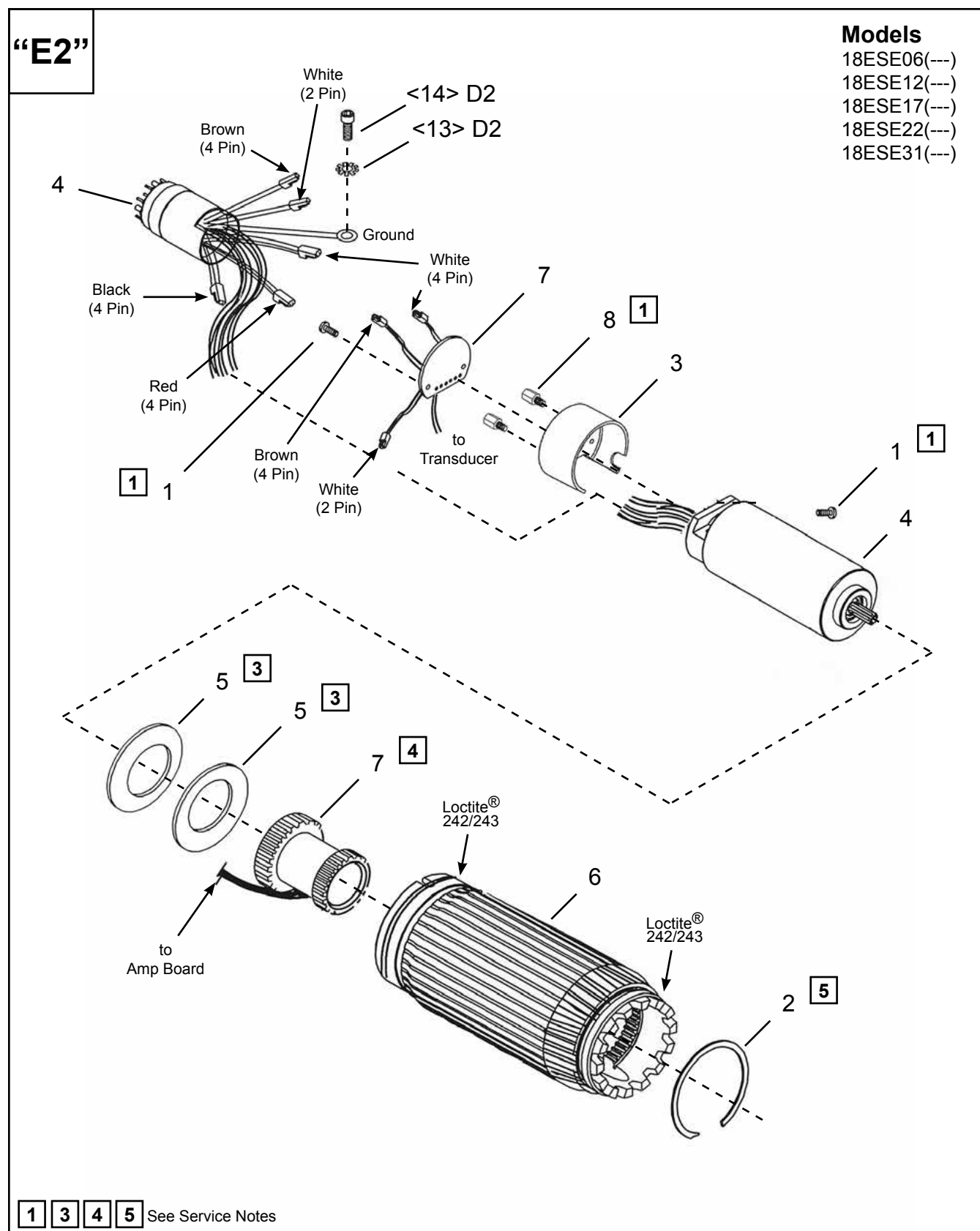
Ref	Number	#	X	EN
				Description
1	17-111	3	6	Pan Head Screw - #4-40 x .19
2	505306	1	2	Retaining Ring
3	542588	1		Motor Spacer
4	301760	1		Motor Assembly
5	541009	2	2	Wave Washer
6	207339	1		Housing
7	Table "E1"	1		Transducer Assembly
8	542244	2	2	Stand Off - 5/16"

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

Table "E1"

Ref.	Description	#	18ES06Q 18ES06D2(B)	#	18ES12Q 18ES12D3(B)	#	18ES17Q 18ES17D3(B)	#	18ES22D3(B) 18ES31D3(B)
7	Transducer (unprogrammed)	1	542846-6	1	542846-12	1	542846-17	1	542846-31
	Transducer (programmed)	1	542846-6P	1	542846-12P	1	542846-17P	1	542846-31P
	Transducer Capacity		6 Nm		12 Nm		17 Nm		31 Nm



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Motor - Air LB Tool Connector

PL12EN-18ES
09/08/2015

Illustration "E2"

Ref	Number	#	X	EN
				Description
1	17-111	3	6	Pan Head Screw - #4-40 x .19
2	505306	1	2	Retaining Ring
3	542588	1		Motor Spacer
4	301760E	1		Motor Assembly
5	541009	2	2	Wave Washer
6	207339	1		Housing
7	Table "E2"	1		Transducer Assembly
8	542244	2	2	Stand Off - 5/16"

(#) Quantity

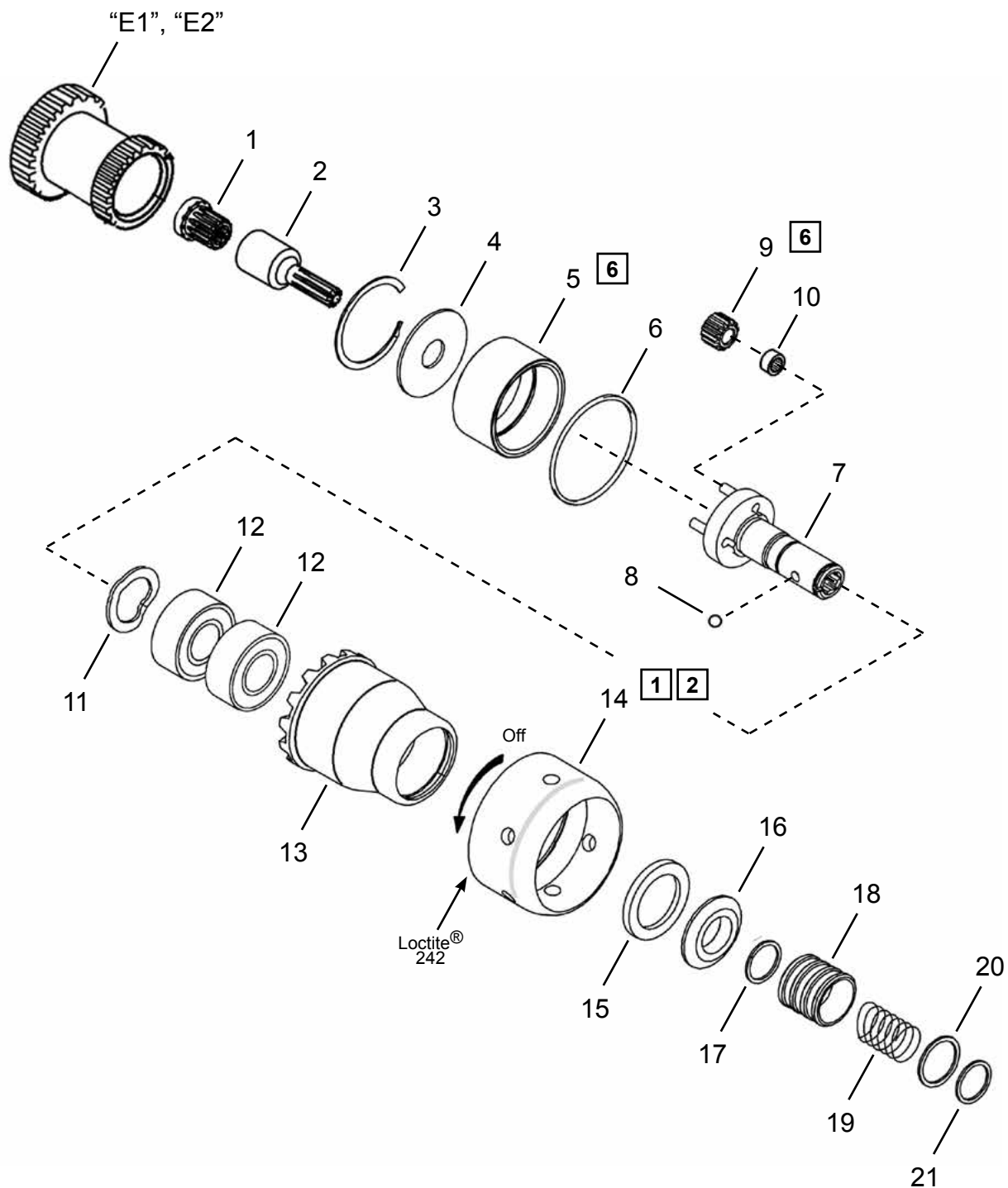
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

Table "E2"

Ref.	Description	#	18ESE06Q 18ESE06D2(B)	#	18ESE12Q 18ESE12D3(B)	#	18ESE17Q 18ESE17D3(B)	#	18ESE22D3(B) 18ESE31D3(B)
7	Transducer (unprogrammed)	1	542846-6	1	542846-12	1	542846-17	1	542846-31
	Transducer (programmed)	1	542846-6P	1	542846-12P	1	542846-17P	1	542846-31P
	Transducer Capacity		6 Nm		12 Nm		17 Nm		31 Nm

"F"

Models
18ES06Q
18ESE06Q



1 2 6 See Service Notes

Cleco®
Single Stage Gearing

PL12EN-18ES
09/08/2015

Illustration "F"

Ref	Number	#	X	EN
				Description
1	541044	1	2	Pinion Adapter
2	541898	1	2	Extension Pinion
3	800116	1	3	Retaining Ring
4	541887	1		Washer
5	542090	1		Ring Gear
6	1011732	1	3	O-Ring
7	542092	1		Output Spindle
8	844265	1	3	Steel Ball (1/8")
9	541893	3	6	Planetary Gear (21T)
10	203749	3	6	Planetary Gear Needle Bearing
11	1019356	1	2	Wave Washer
12	542089	2	4	Ball Bearing
13	542091	1		Gear Case
14	541904	1		Front Nut
15	542076	1	2	Retaining Ring
16	541914	1	2	Spindle Washer
17	833688	1	3	Retaining Ring
18	536592	1		Sleeve
19	540842	1	3	Spring
20	540800	1	3	Washer
21	503009	1	3	Retaining Ring

(#) Quantity

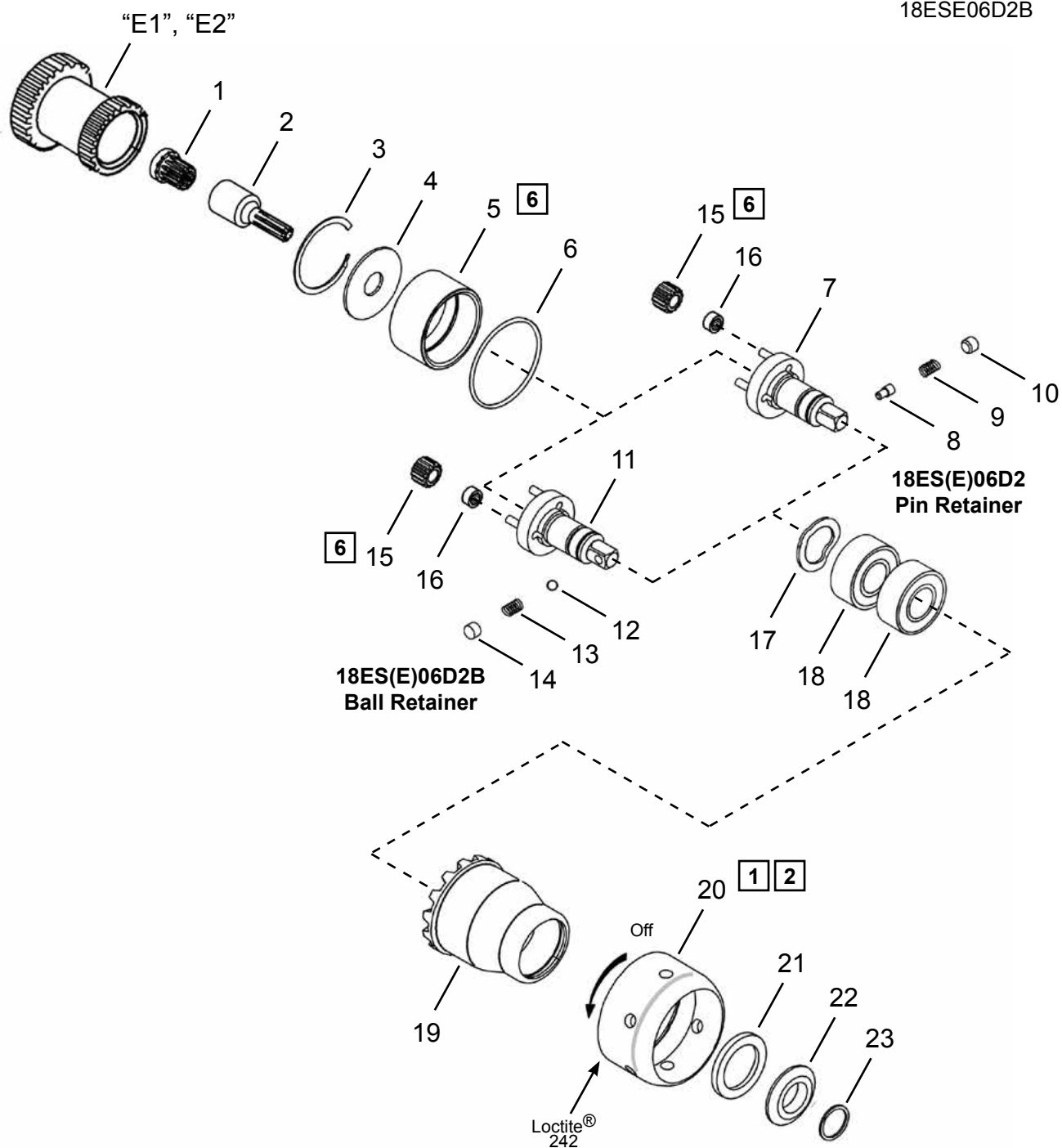
(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

"G"

Models

18ES06D2
18ES06D2B
18ESE06D2
18ESE06D2B



1 2 6 See Service Notes

Cleco®
Single Stage Gearing

PL12EN-18ES
09/08/2015

Illustration "G"

Ref	Number	#	X	EN
				Description
1	541044	1	2	Pinion Adapter
2	541898	1	2	Extension Pinion
3	800116	1	3	Retaining Ring
4	541887	1		Washer
5	542090	1		Ring Gear
6	1011732	1	3	O-Ring
7	542093	1		Output Spindle - Pin Retainer (includes Ref. 8-10)
8	23569	1	3	Button
9	27722PT	1	3	Spring
10	26989PT	1	3	Plug
11	543423	1		Output Spindle - Ball Retainer (includes Ref. 12-14)
12	94010006	1	3	Steel Ball (1/8")
13	WS-252	1	3	Spring
14	LB-252	1	3	Bushing
15	541893	3	6	Planetary Gear (21T)
16	203749	3	6	Planetary Gear Needle Bearing
17	1019356	1	2	Wave Washer
18	542089	2	4	Ball Bearing
19	542091	1		Gear Case
20	541904	1		Front Nut
21	542076	1	2	Retaining Ring
22	541919	1	2	Spindle Washer
23	800216	1	3	Retaining Ring

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

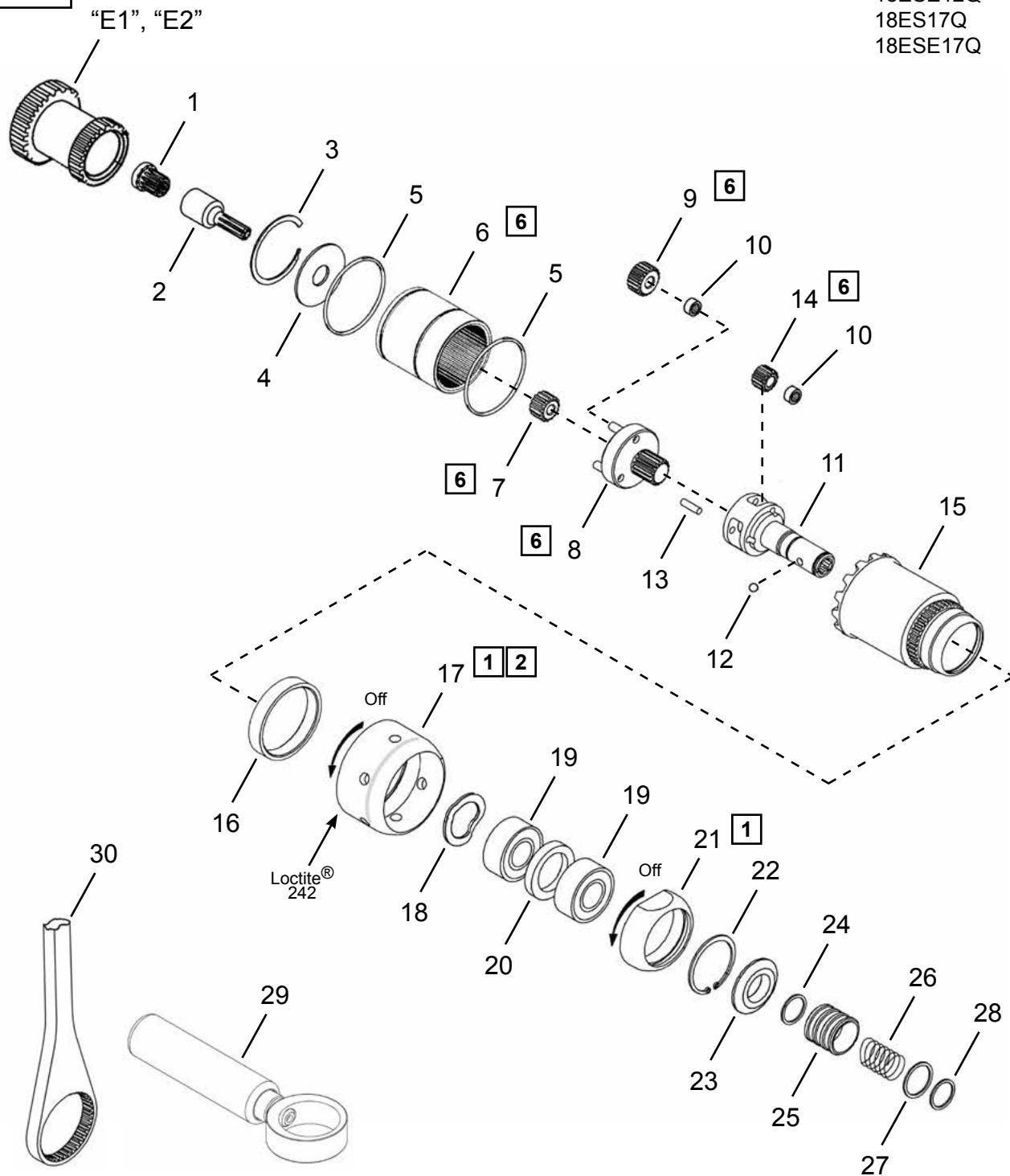
(T) Teeth

Cleco®
Double Stage Gearing

"H"

Models

18ES12Q
18ESE12Q
18ES17Q
18ESE17Q



[1] [2] [6] See Service Notes

Cleco®
Double Stage Gearing

PL12EN-18ES
09/08/2015

Illustration "H"

Ref	Number	#	X	EN
				Description
1	541044	1	2	Pinion Adapter
2	541898	1	2	Extension Pinion
3	800116	1	3	Retaining Ring
4	541887	1		Washer
5	542724	2	6	O-Ring
6	542722	1		Ring Gear
7	541899	1	3	Slip-On Gear
8	Table "H"	1		Planetary Gear Carrier
9	541894	3	6	Planetary Gear (17T)
10	203749	6	12	Planetary Gear Needle Bearing
11	Table "H"	1		Output Spindle
12	844265	1	3	Steel Ball (1/8")
13	541888	3	6	Planetary Gear Pin
14	Table "H"	3	6	Planetary Gear
15	542723	1		Gear Case
16	542134	1		Spline Guard
17	541904	1		Front Nut
18	1019356	1	2	Wave Washer
19	542089	2	4	Ball Bearing
20	541775	1		Bearing Spacer
21	542097	1		Retaining Nut
22	542076	1	2	Retaining Ring
23	541914	1	2	Spindle Washer
24	833688	1	3	Retaining Ring
25	536592	1		Sleeve
26	540842	1	3	Spring
27	540800	1	3	Washer
28	503009	1	3	Retaining Ring
29	Table "H"	1		Dead Handle Assembly
30	Table "H"	1		Reaction Bar

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

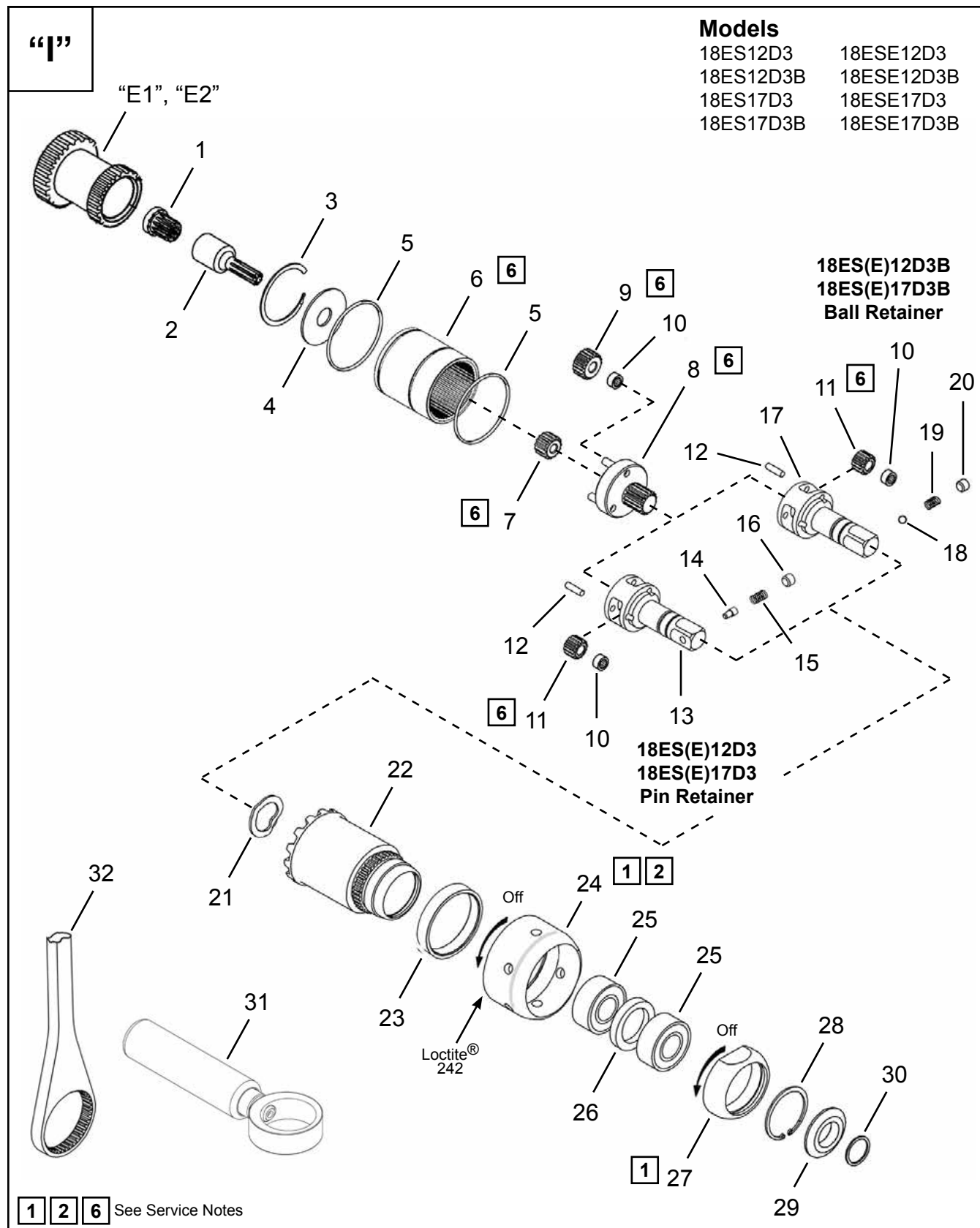
(T) Teeth

Table "H"

Ref.	Description	#	18ES12Q 18ESE12Q	#	18ES17Q 18ESE17Q
8	Planetary Gear Carrier	1	542230	1	542233
11	Output Spindle	1	541902	1	541926
14	Planetary Gear	3	541894 (17T)	3	541897 (20T)
29	Dead Handle Assembly	1	301934PT		-----
30	Reaction Bar		-----	1	542127

(T) Teeth

Cleco®
Double Stage Gearing



Cleco®
Double Stage Gearing

PL12EN-18ES
09/08/2015

Illustration "I"

Ref	Number	#	X	EN
				Description
1	541044	1	2	Pinion Adapter
2	541898	1	2	Extension Pinion
3	800116	1	3	Retaining Ring
4	541887	1		Washer
5	542724	2	6	O-Ring
6	542722	1		Ring Gear
7	541899	1	3	Slip-On Gear
8	Table "I"	1		Planetary Gear Carrier
9	541894	3	6	Planetary Gear (17T)
10	203749	6	12	Planetary Gear Needle Bearing
11	Table "I"	3	6	Planetary Gear
12	541888	3	6	Planetary Gear Pin
13	Table "I"	1		Output Spindle - Pin Retainer (includes Ref. 14-16)
14	24499	1	3	Button
15	9D6481	1	3	Spring
16	26989PT	1	3	Plug
17	Table "I"	1		Output Spindle - Ball Retainer (includes Ref. 18-20)
18	1091PT	1	3	Steel Ball
19	WS371	1	3	Spring
20	LB370	1	3	Plug
21	1019356	1	2	Wave Washer
22	542723	1		Gear Case
23	542134	1		Spline Guard
24	541904	1		Front Nut
25	542089	2	4	Ball Bearing
26	541775	1		Bearing Spacer
27	542097	1		Retaining Nut
28	542076	1	2	Retaining Ring
29	541919	1	2	Spindle Washer
30	800216	1	3	Retaining Ring
31	Table "I"	1		Dead Handle Assembly
32	Table "I"	1		Reaction Bar

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

Table "I"

Ref.	Description	#	18ES12D3 18ESE12D3	#	18ES12D3B 18ESE12D3B	#	18ES17D3 18ESE17D3	#	18ES17D3B 18ESE17D3B
8	Planetary Gear Carrier	1	542230	1	542230	1	542233	1	542233
11	Planetary Gear	3	541894 (17T)	3	541894 (17T)	3	541897 (20T)	3	541897 (20T)
13	Output Spindle (Pin)	1	541916		-----	1	541917		-----
17	Output Spindle (Ball)		-----	1	543424		-----	1	543425
31	Dead Handle Assembly	1	301934PT	1	301934PT		-----		-----
32	Reaction Bar		-----		-----	1	542127	1	542127

(T) Teeth



Models

18ES22D3	18ESE22D3
18ES22D3B	18ESE22D3B
18ES31D3	18ESE31D3
18ES31D3B	18ESE31D3B

18ES(E)22D3B
18ES(E)31D3B
Ball Retainer

18ES(E)22D3
18ES(E)31D3
Pin Retainer

Loctite®
242

1 **2** **6** See Service Notes

Cleco®
Double Stage Gearing

PL12EN-18ES
09/08/2015

Illustration "J"

Ref	Number	#	X	EN
				Description
1	541044	1	2	Pinion Adapter
2	541898	1	2	Extension Pinion
3	800116	1	3	Retaining Ring
4	541887	1		Washer
5	542724	2	6	O-Ring
6	542722	1		Ring Gear
7	Table "J"	1		Planetary Gear Carrier
8	541893	3	6	Planetary Gear (21T)
9	203749	6	12	Planetary Gear Needle Bearing
10	Table "J"	3	6	Planetary Gear
11	541888	3	6	Planetary Gear Pin
12	Table "J"	1		Output Spindle - Pin Retainer (includes Ref. 13-15)
13	24499	1	3	Button
14	9D6481	1	3	Spring
15	26989PT	1	3	Plug
16	Table "J"	1		Output Spindle - Ball Retainer (includes Ref. 17-19)
17	1091PT	1	3	Steel Ball
18	WS-371	1	3	Spring
19	LB-370	1	3	Plug
20	1019356	1	2	Wave Washer
21	542723	1		Gear Case
22	542134	1		Spline Guard
23	541904	1		Front Nut
24	542089	2	4	Ball Bearing
25	541775	1		Bearing Spacer
26	542097	1		Retaining Nut
27	542076	1	2	Retaining Ring
28	541919	1	2	Spindle Washer
29	800216	1	2	Retaining Ring
30	542127	1		Reaction Bar

(#) Quantity

(X) Recommended Spare Parts (quantity shown based on 1-5 tools in operation)

(T) Teeth

Table "J"

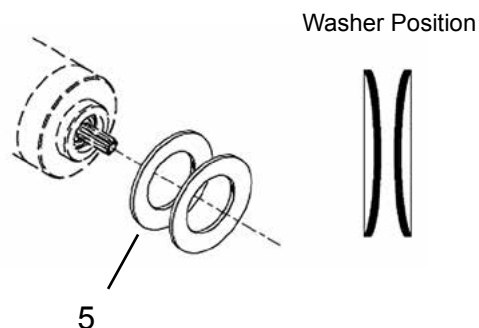
Ref.	Description	#	18ES22D3 18ESE22D3	#	18ES22D3B 18ESE22D3B	#	18ES31D3 18ESE31D3	#	18ES31D3B 18ESE31D3B
7	Planetary Gear Carrier	1	542231	1	542231	1	542232	1	542232
10	Planetary Gear	3	541894 (17T)	3	541894 (17T)	3	541897 (20T)	3	541897 (20T)
12	Output Spindle (Pin)	1	541916		-----	1	541917		-----
16	Output Spindle (Ball)		-----	1	543424		-----	1	543425

(T) Teeth

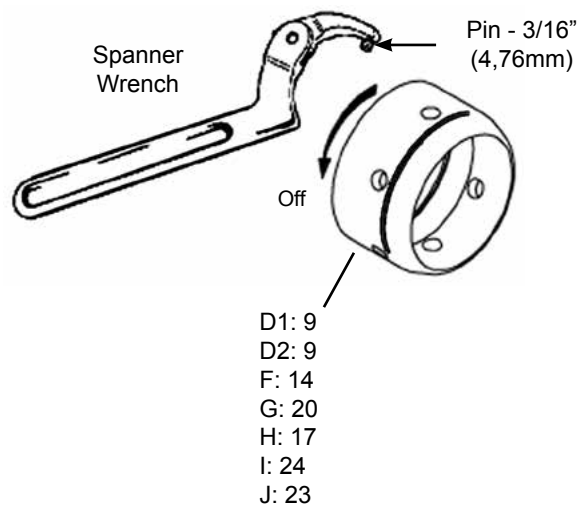
1 Tightening Torque

Illustration	Reference	Tightening torque	
		Ft-Lbs (in-lbs)	Nm
D1, D2	1	25-30	34-41
	9	35-40	47-54
	14	(10-14)	1.1-1.6
E1, E2	1	(4-6)	0.45-0.68
	8	(4-6)	0.45-0.68
F	14	35-40	47-54
G	20	35-40	47-54
H	17	35-40	47-54
	21	30-35	41-47
I	24	35-40	47-54
	27	30-35	41-47
J	23	35-40	47-54
	26	30-35	41-47

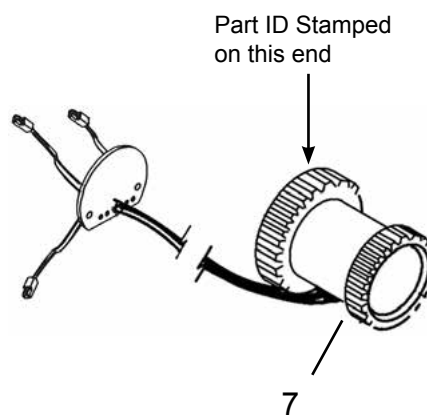
3 Washer Assembly



2 Spanner Wrench

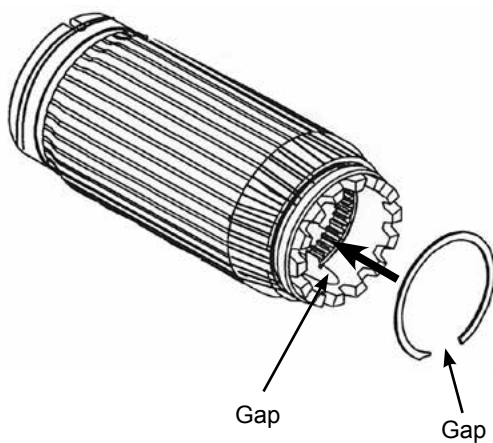


4 Transducer Identification



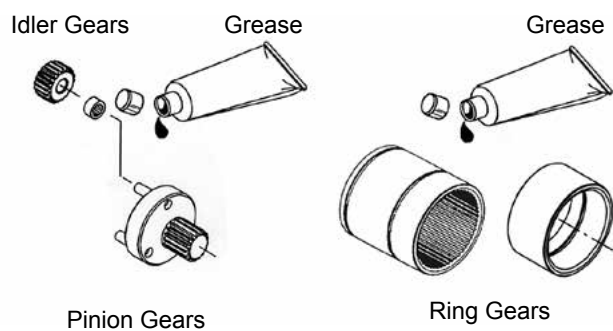
Transducers are not interchangeable, check part number.

5 Retaining Ring Assembly



6 Gear Train Lubrication

541444 - 2 oz. (56 g)
541445 - 1 pound (0,45 kg)



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