

Parts Manual
PL12EN-48ES-ZB
10/19/2011

Cleco[®]

48ES Series
Electronically Controlled Floating Spindle Nutrunner



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

Language Version:

This Parts Manual is the **“Original Instructions”** intended for all persons who will use or repair these tools.

Product Identification:

Refer to the “Model Nomenclature” page in this document.

Noise and Vibration:

Refer to documents CE-1002DC and CE-1002TD.

General Description:

Brushless DC electric transducer controlled inline portable nutrunners.

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 as a hammer, lever or other improper usage that can cause tool damage and operator injury.

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“A”

	48	E	S	X	XXX	XXX
<u>Tool Series</u> 48						
<u>Motor Style</u> E = Brushless Electric Motor						
<u>Tool Type</u> S = Inline						
<u>Feature</u> - = Matrix Tool Connector (Standard) E = Air LB Connector						
<u>Maximum Torque Nm (rounded to nearest Nm)</u> 12 = 12 Nm 27 = 27 Nm 36 = 36 Nm 60 = 60 Nm 70 = 70 Nm 80 = 80 Nm 115 = 115 Nm 150 = 150 Nm 165 = 165 Nm 250 = 250 Nm						
<u>Attachment</u> ZA = 1/4" Square Drive Floating Spindle 1ZB = 3/8" Square Drive Floating Spindle 2ZB = 1/2" Square Drive Floating Spindle 3ZB = 3/4" Square Drive Floating Spindle						

“B”

m-Pro-400 Series
Controller



TME-200 Series
Controller



Complete Tool Order Number	Floating Spindle Order Number
48ES(E)12ZA	930300
48ES(E)271ZB	301918
48ES(E)361ZB	301918
48ES(E)602ZB	301919
48ES(E)702ZB	301919
48ES(E)802ZB	301919
48ES(E)1152ZB	301919
48ES(E)1502ZB	301919
48ES(E)1653ZB	301920
48ES(E)2503ZB	301920

m-Pro-400GC
Global Controller



m-Pro-400-IT
Isolation Transformer
(48ES Models)



TME and m-Pro-400 Series Controllers

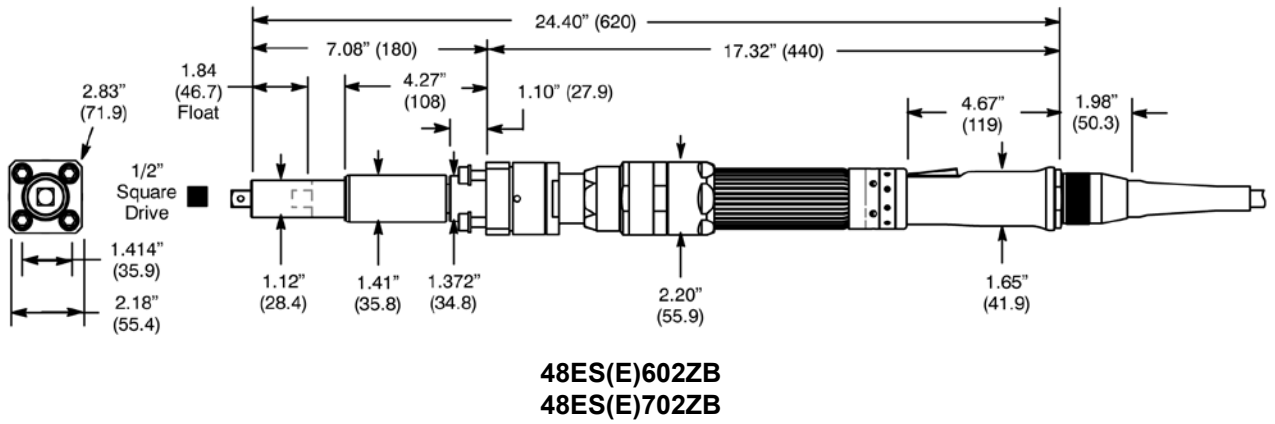
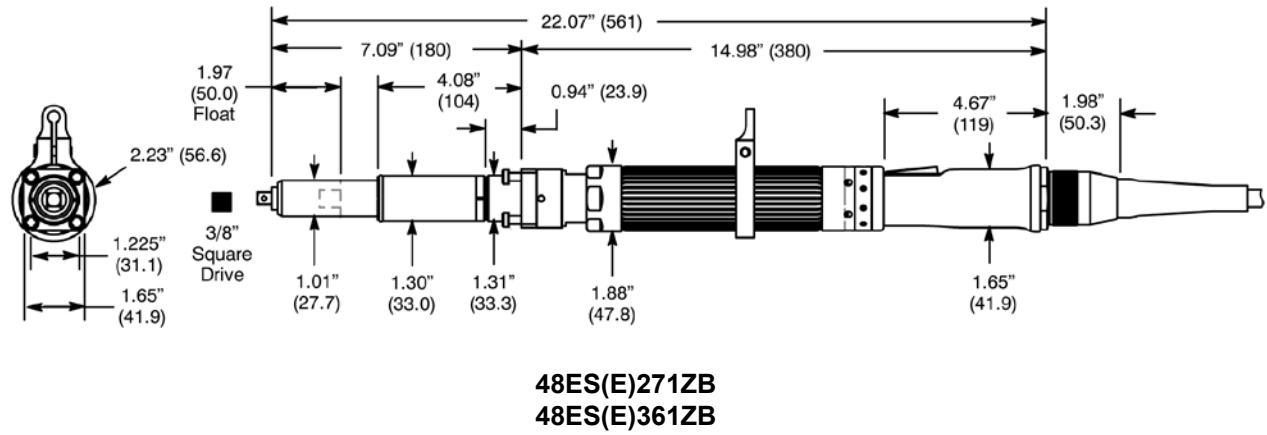
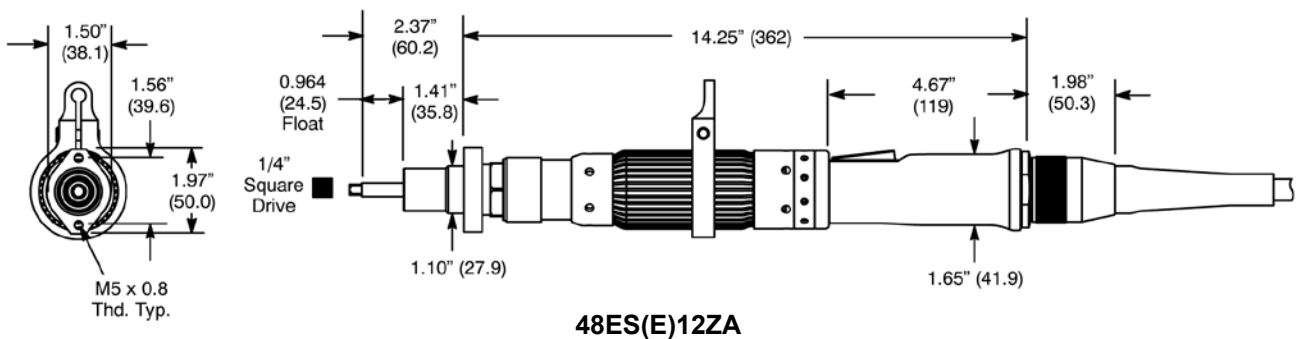
48ES	48ESE	EN	
		Description	
115 VAC	Standard	TMEI-114-15-U	
115 VAC	DeviceNet	TMEI-114-15-U-ED	
115 VAC	ProfiBus	TMEI-114-15-U-EP	
TME-200	m-Pro-400	Controller	
PL12()-1300	*	Programming Notes	
575708	*	Battery	
541683-01	*	Power Cord: 115VAC - USA	
541683-02	*	Power Cord: 230VAC - USA	
541683-03	*	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

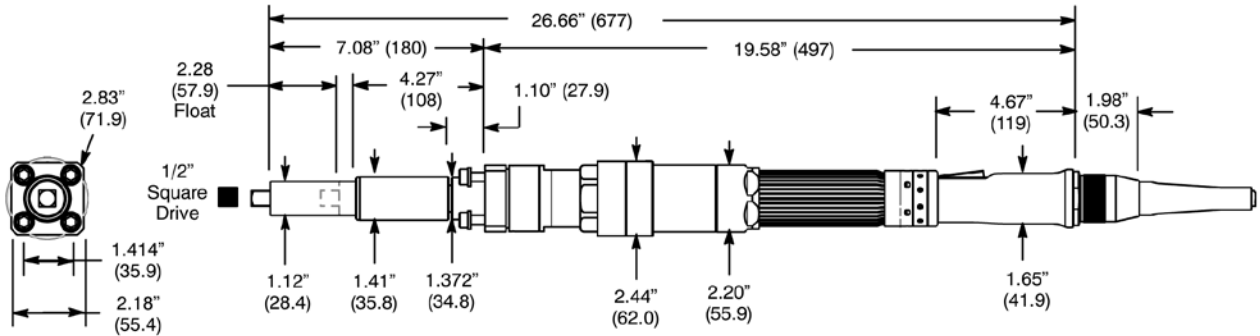
TME-200 Series Controller

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	

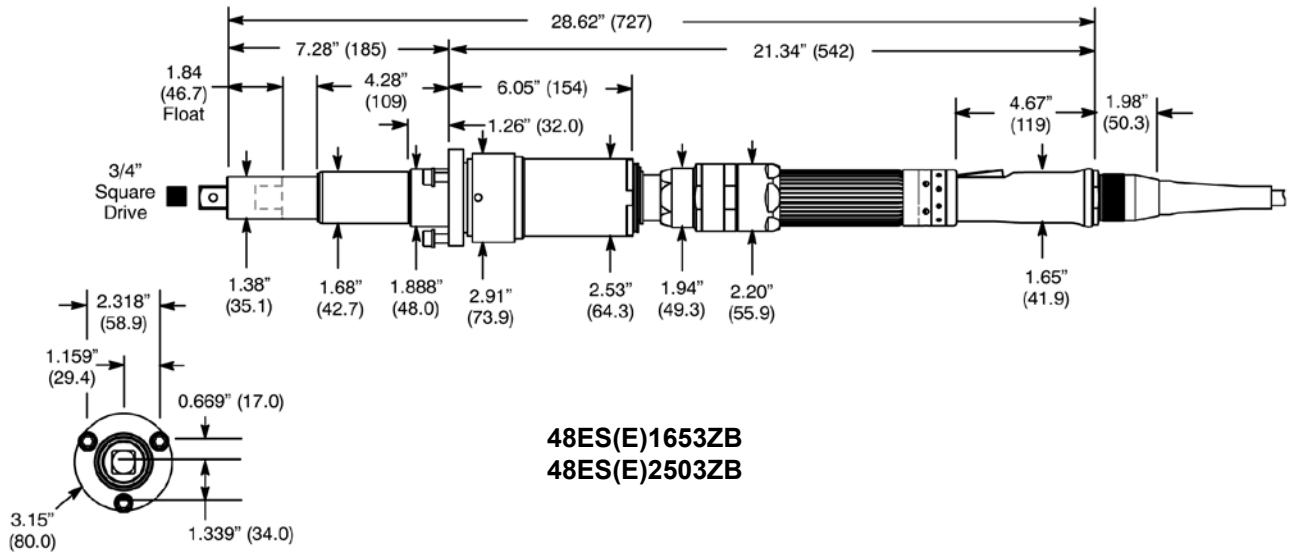
“C1”



“C2”



48ES(E)802ZB
48ES(E)1152ZB
48ES(E)1502ZB



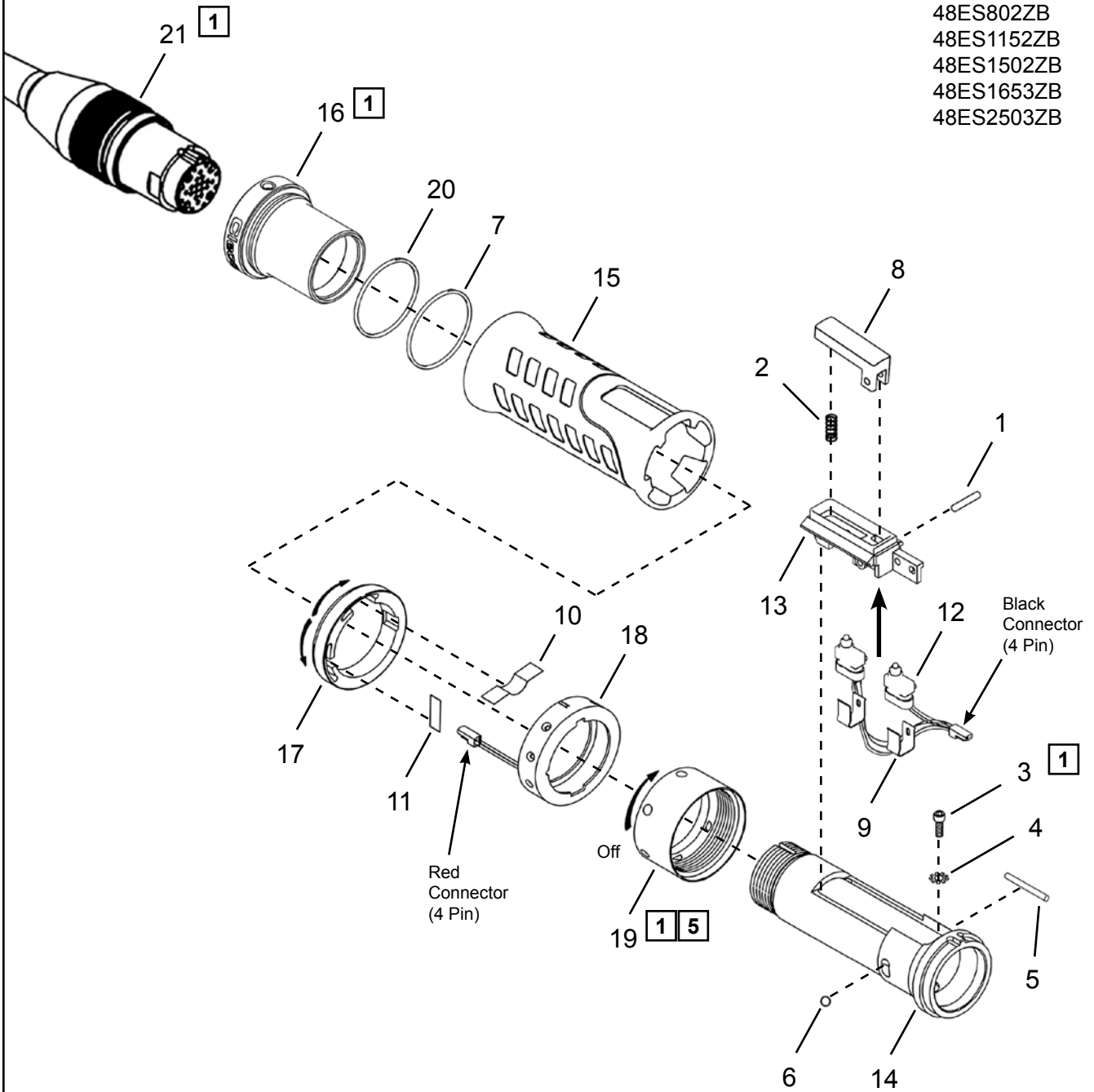
48ES(E)1653ZB
48ES(E)2503ZB

Cleco®
Handle - Matrix Tool Connector

“D1”

Models

- 48ES12ZA
- 48ES271ZB
- 48ES361ZB
- 48ES602ZB
- 48ES702ZB
- 48ES802ZB
- 48ES1152ZB
- 48ES1502ZB
- 48ES1653ZB
- 48ES2503ZB



1 5 See Service Notes

Handle - Matrix Tool Connector

Illustration "D1"

Ref	Number	#	X	EN	
				Description	
1	541480	1	3	Switch Pin	
2	266255	1	3	Switch Spring	
3	B159V	1	3	Cap Screw - #6-32	
4	W115	1	3	Lock Washer	
5	1009089	1	3	Housing Pin	
6	1091PT	1	3	Steel Ball - 3/16"	
7	22598	1	3	O-Ring	
8	F900185	1		Switch Actuator	
9	207317	2	2	Switch Spring Clip	
10	541033	1	2	Reverse Spring	
11	541624	1	2	Forward/Reverse Spring	
12	F900571	1	2	Start/Reverse Switch	
13	207316	1		Switch Holder	
14	541015	1		Handle	
15	207323	1		Handle Sleeve	
16	207325	1		Connector Sleeve	
17	542938	1		Reverse Ring	
18	542819	1		Light Ring Assembly	
19	541017	1		Handle Retainer Nut	
20	524818	1	3	O-Ring	
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	
	542778-50M			50 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

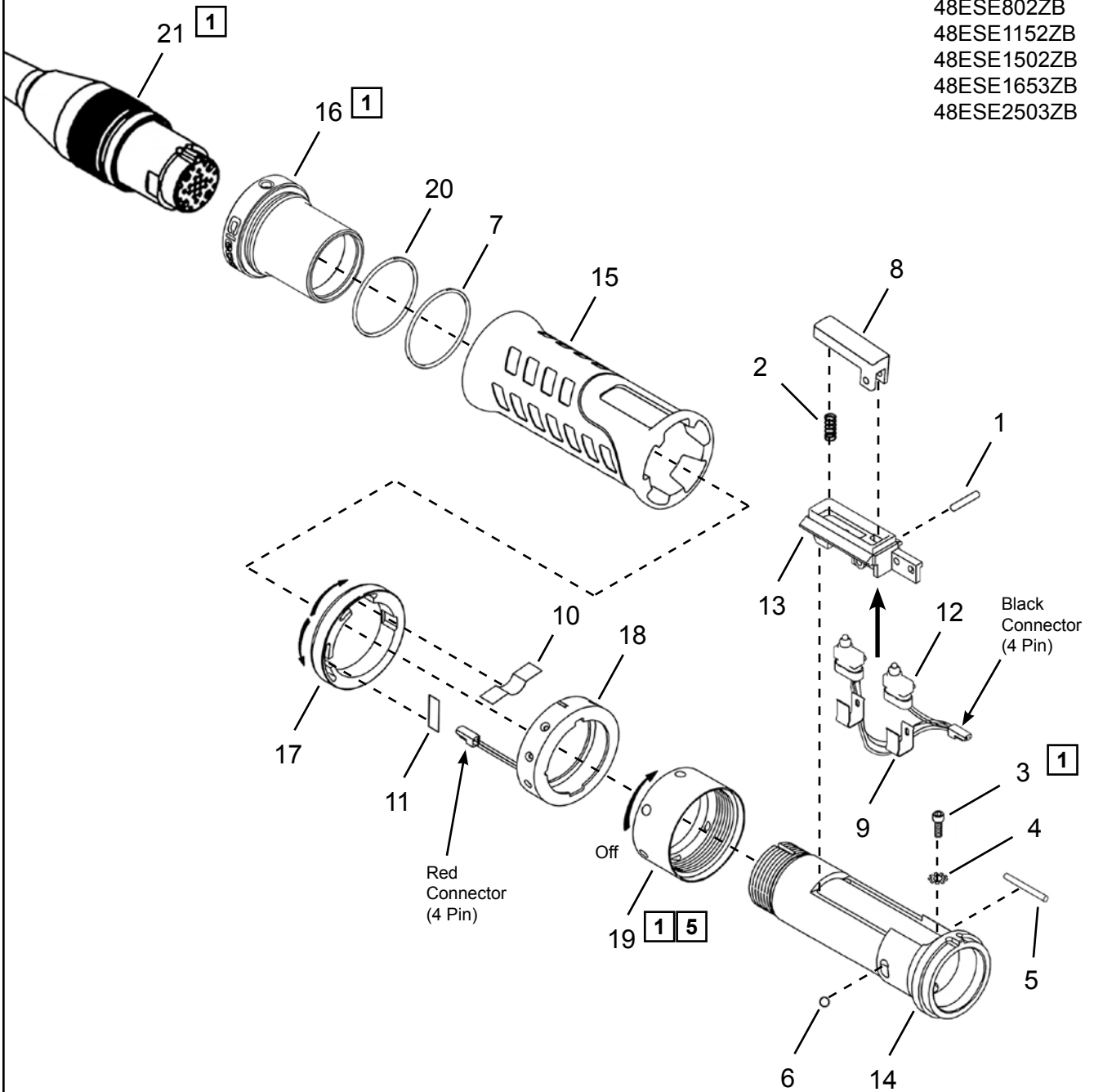
(X) Recommended Spare Parts

Cleco®
Handle - Air LB Tool Connector

“D2”

Models

- 48ESE12ZA
- 48ESE271ZB
- 48ESE361ZB
- 48ESE602ZB
- 48ESE702ZB
- 48ESE802ZB
- 48ESE1152ZB
- 48ESE1502ZB
- 48ESE1653ZB
- 48ESE2503ZB



1 5 See Service Notes

Handle - Air LB Tool Connector

Illustration "D2"

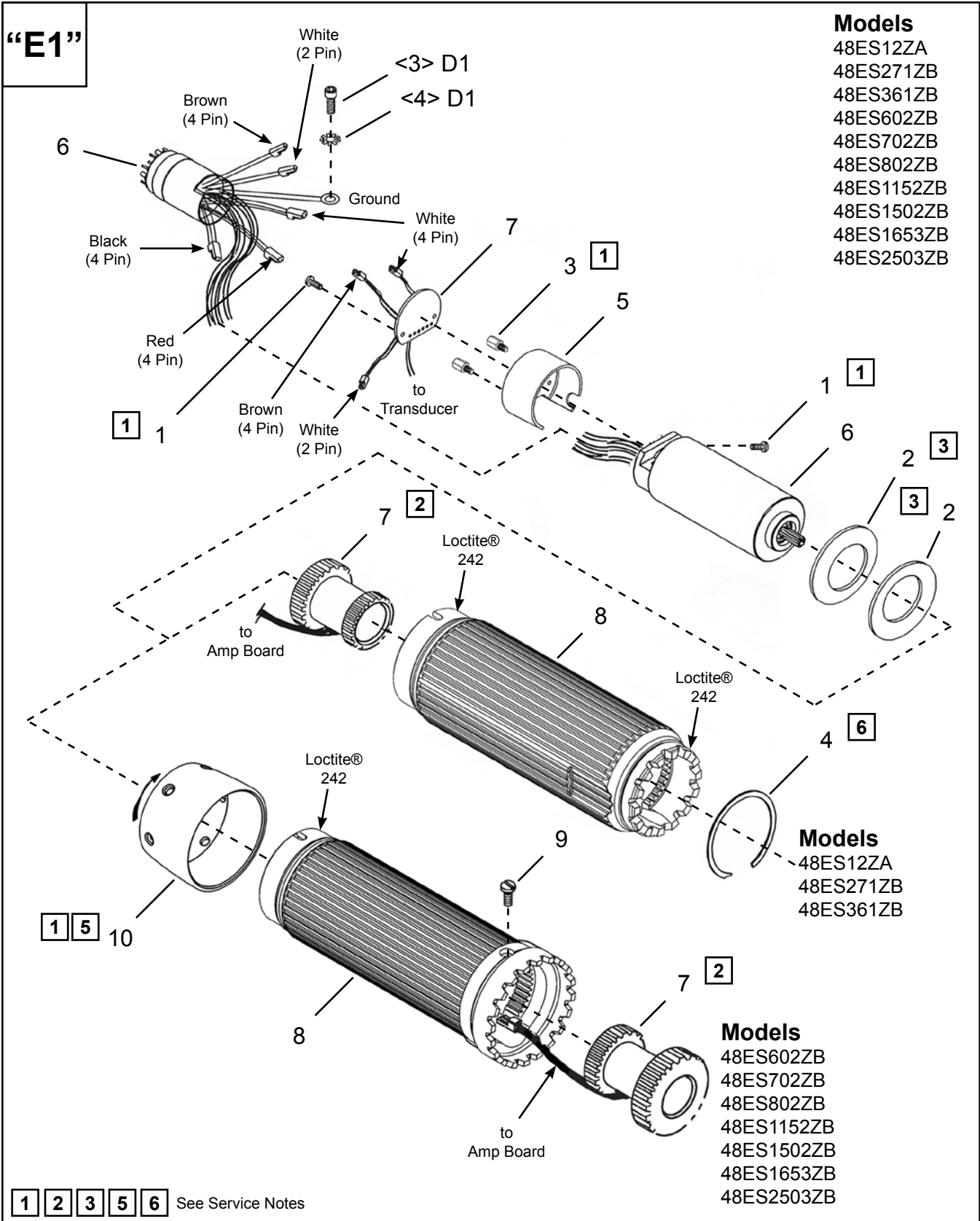
Ref	Number	#	X	EN	
				Description	
1	541480	1	3	Switch Pin	
2	266255	1	3	Switch Spring	
3	B159V	1	3	Cap Screw - #6-32	
4	W115	1	3	Lock Washer	
5	1009089	1	3	Housing Pin	
6	1091PT	1	3	Steel Ball - 3/16"	
7	22598	1	3	O-Ring	
8	F900185	1		Switch Actuator	
9	207317	2	2	Switch Spring Clip	
10	541033	1	2	Reverse Spring	
11	541624	1	2	Forward/Reverse Spring	
12	F900571	1	2	Start/Reverse Switch	
13	207316	1		Switch Holder	
14	207322	1		Handle	
15	207323	1		Handle Sleeve	
16	207325E	1		Connector Sleeve	
17	542938	1		Reverse Ring	
18	542819	1		Light Ring Assembly	
19	541017	1		Handle Retainer Nut	
20	524818	1	3	O-Ring	
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

Cleco®

Motor - Matrix Tool Connector



Motor - Matrix Tool Connector

Illustration "E1"

Ref	Number	#	X	EN
				Description
1	17-111	3	6	Pan Head Screw - #4-40 x .19
2	541009	2	2	Wave Washer
3	542244	2	2	Stand Off - 5/16"
4	Table "E1"	1	2	Retaining Ring
5	542588	1		Motor Spacer
6	301761	1		Motor Assembly
7	Table "E1"	1		Transducer Assembly
8	Table "E1"	1		Housing
9	B159X	1	3	Screw
10	207353	1		Lock Nut

(#) Quantity

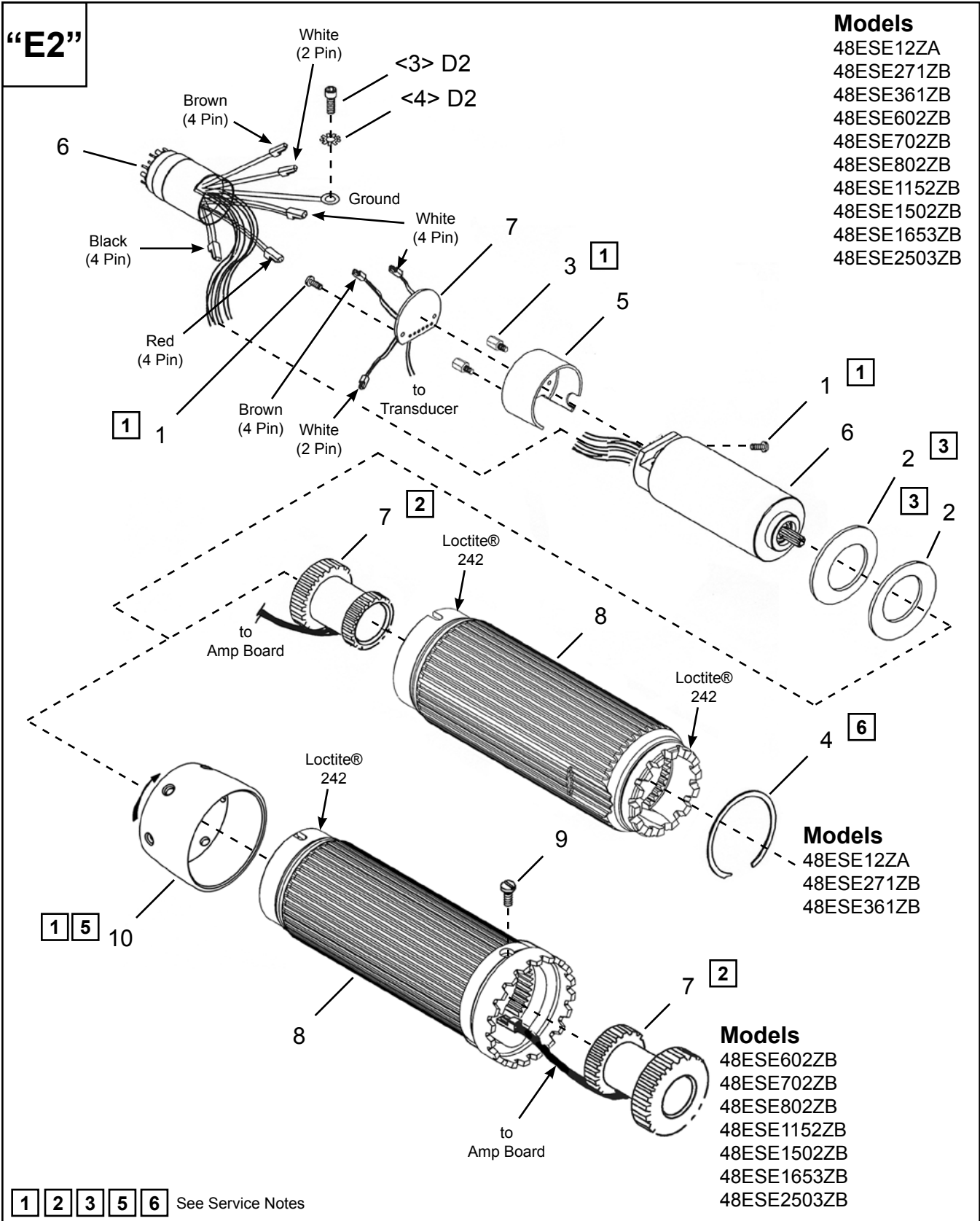
(X) Recommended Spare Parts

Table "E1"

Ref.	Description	#	48ES12		48ES27		48ES36		48ES60 48ES70 48ES165 48ES250			48ES80 48ES115 48ES150	
			#		#		#		#		#		
4	Retaining Ring	1	505306	1	505306	1	505306		-----		-----		
7	Transducer (unprogrammed)	1	542846-12	1	542846-31	1	542846-36	1	542846-100	1	542846-40		
	Transducer (programmed)	1	542846-12P	1	542846-31P	1	542846-36P	1	542846-100P	1	542846-40P		
	Transducer Capacity		12 Nm		31 Nm		36 Nm		100 Nm		40 Nm		
8	Housing	1	207340	1	207340	1	207340	1	207341	1	207341		

Cleco®

Motor - Air LB Tool Connector



Motor - Air LB Tool Connector

Illustration "E2"

Ref	Number	#	X	EN	
				Description	
1	17-111	3	6	Pan Head Screw - #4-40 x .19	
2	541009	2	2	Wave Washer	
3	542244	2	2	Stand Off - 5/16"	
4	Table "E2"	1	2	Retaining Ring	
5	542588	1		Motor Spacer	
6	301761E	1		Motor Assembly	
7	Table "E2"	1		Transducer Assembly	
8	Table "E2"	1		Housing	
9	B159X	1	3	Screw	
10	207353	1		Lock Nut	

(#) Quantity

(X) Recommended Spare Parts

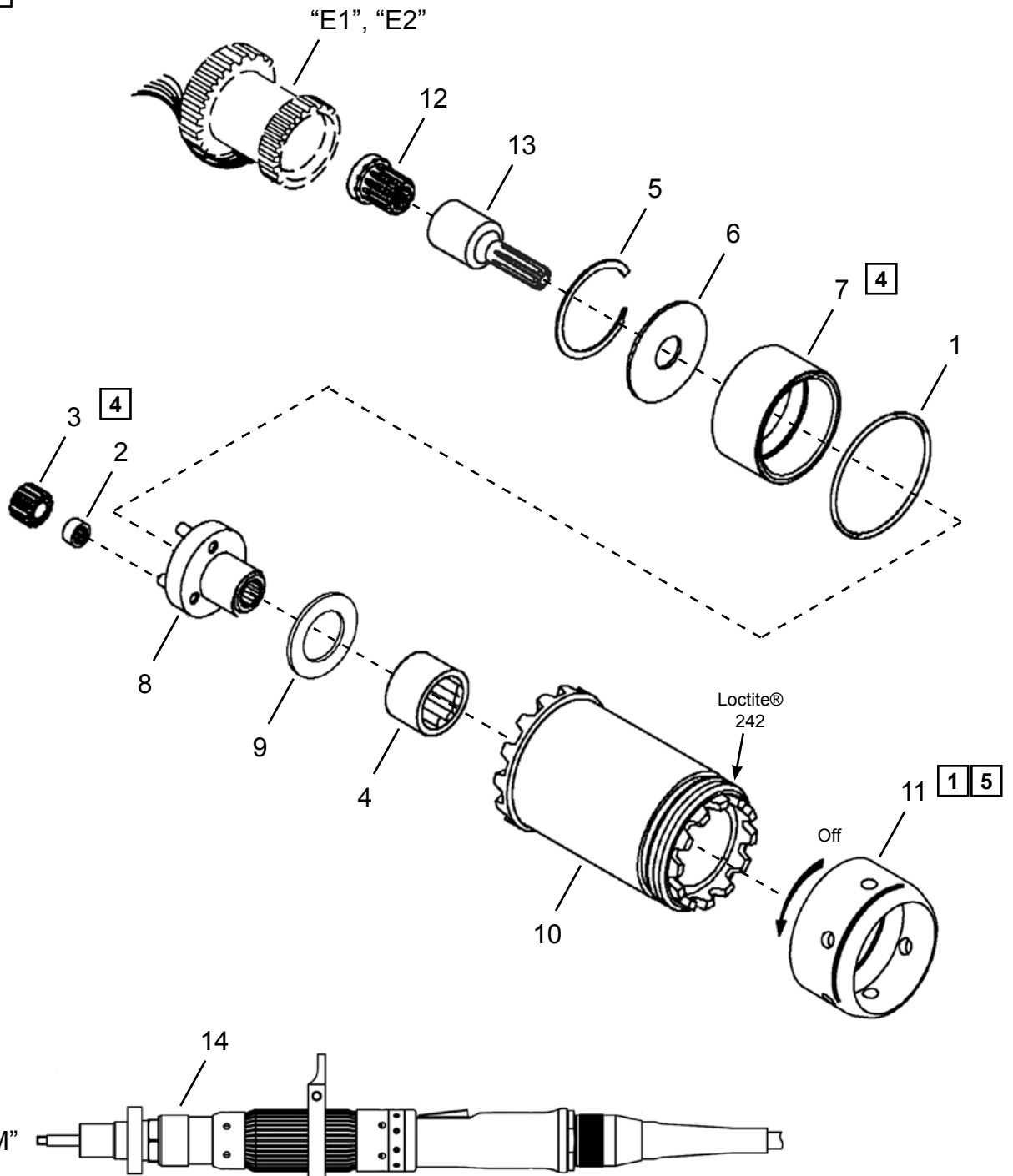
Table "E2"

Ref.	Description	#	48ESE12		48ESE27		48ESE36		48ESE60 48ESE70 48ESE165 48ESE250			48ESE80 48ESE115 48ESE150	
			#		#		#		#		#		
4	Retaining Ring	1	505306	1	505306	1	505306		-----		-----		
7	Transducer (unprogrammed)	1	542846-12	1	542846-31	1	542846-36	1	542846-100	1	542846-40		
	Transducer (programmed)	1	542846-12P	1	542846-31P	1	542846-36P	1	542846-100P	1	542846-40P		
	Transducer Capacity		12 Nm		31 Nm		36 Nm		100 Nm		40 Nm		
8	Housing	1	207340	1	207340	1	207340	1	207341	1	207341		

Cleco® Single Stage Gearing

Models
48ES(E)12ZA

“F”



1 **4** **5** See Service Notes

Cleco®
Single Stage Gearing

PL12EN-48ES-ZB
10/19/2011

Illustration "F"

Ref	Number	#	X	EN
				Description
1	1011732	1	3	O-Ring
2	203749	3	6	Needle Bearing
3	541893	3	6	Planet Gear (21T)
4	500528	1	3	Needle Bearing
5	800116	1	3	Retaining Ring
6	541887	1		Washer
7	542090	1		Ring Gear (52T)
8	542793	1		Planet Carrier
9	502983	1		Thrust Washer
10	542794	1		Attachment Adapter (includes Ref. 4)
11	541904	1		Front Nut
12	541044	1	2	Pinion Adapter
13	541898	1	2	Extension Pinion
14	930300	1		ZA Attachment

(#) Quantity

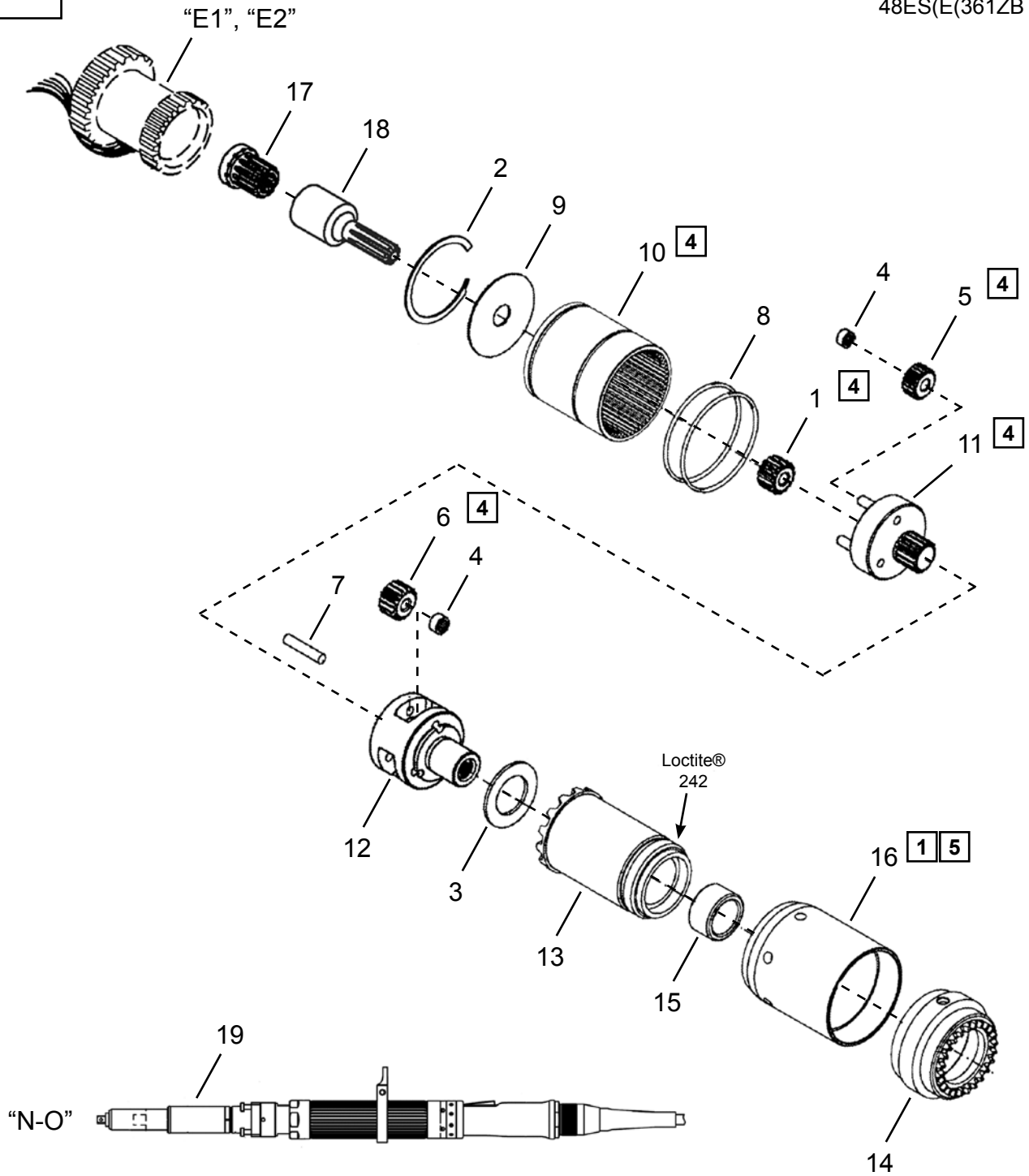
(X) Recommended Spare Parts

(T) Teeth

Cleco® Double Stage Gearing

“G”

Models
48ES(E)271ZB
48ES(E)361ZB



1 4 5 See Service Notes

Cleco®
Double Stage Gearing

PL12EN-48ES-ZB
10/19/2011

Illustration "G"

Ref	Number	#	X	EN	
				Description	
1	541899	1	2	Slip-On Gear	
2	800116	1	2	Retaining Ring	
3	Table "G"	1		Thrust Washer	
4	203749	6	12	Needle Bearing	
5	541894	3	6	Planet Gear (17T)	
6	Table "G"	3	6	Planet Gear	
7	541888	3	6	Planet Pin	
8	542724	2	6	O-Ring	
9	541887	1		Washer	
10	542722	1		Ring Gear	
11	Table "G"	1		Planet Carrier	
12	Table "G"	1		Planet Cage	
13	207347	1		Attachment Adapter	
14	207348	1		Spindle Adapter	
15	500528	1	3	Needle Bearing	
16	543462-02	1		Gear Case Nut	
17	541044	1	2	Pinion Adapter	
18	541898	1	2	Extension Pinion	
19	301918	1		1ZB Attachment	

(#) Quantity
(X) Recommended Spare Parts
(T) Teeth

Table "G"

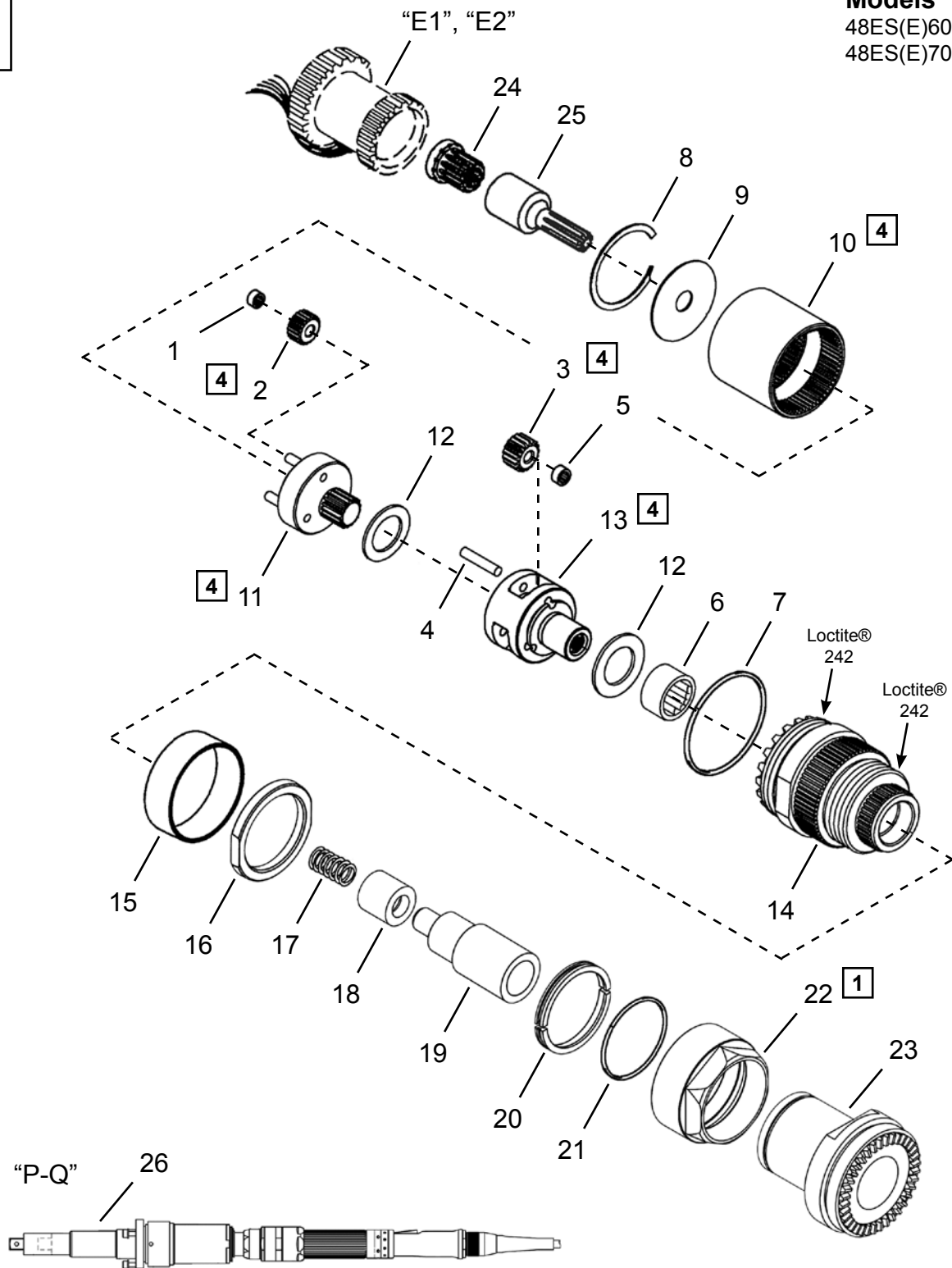
Ref.	Description	#	48ES(E)271ZB	#	48ES(E)361ZB
3	Washer	1	502983	1	207303
6	Planet Gear	3	541894 (17T)	3	541897 (20T)
11	Planet Cage	1	542230	1	542233
12	Planet Cage	1	542079	1	542099

(T) Teeth

Cleco®
Double Stage Gearing

Models
48ES(E)602ZB
48ES(E)702ZB

“H”



1 4 See Service Notes

Cleco®
Double Stage Gearing

PL12EN-48ES-ZB
10/19/2011

Illustration "H"

Ref	Number	#	X	EN	
				Description	
1	541488	3	6	Needle Bearing	
2	541478	3	6	Planet Gear (27T)	
3	Table "H"	3	6	Planet Gear	
4	541492	3	6	Planet Pin (Output)	
5	541489	3	6	Needle Bearing	
6	800177	3	6	Needle Bearing	
7	1010843	1	1	O-Ring	
8	541210	1	1	Retaining Ring	
9	541185	1		Washer	
10	541167	1		Ring Gear	
11	Table "H"	1		Planet Carrier	
12	510675	2		Thrust Washer	
13	Table "H"	1		Planet Cage (Output)	
14	541045	1		Gear Case (includes Ref. 6)	
15	541169	1		Cover	
16	207352	1		Retaining Nut	
17	542216	1	3	Spring	
18	542573	1		Spacer	
19	540089	1		Drive Adapter (includes Ref. 18)	
20	515544	1		Split Ring (includes Ref. 21)	
21	526483	1	3	Rubber Band	
22	510653	1		Lock Nut	
23	540078	1		Mounting Adapter	
24	541044	1	2	Pinion Adapter	
25	541043	1	2	Extension Pinion	
26	301919	1		2ZB Attachment	

(#) Quantity
(X) Recommended Spare Parts
(T) Teeth

Table "H"

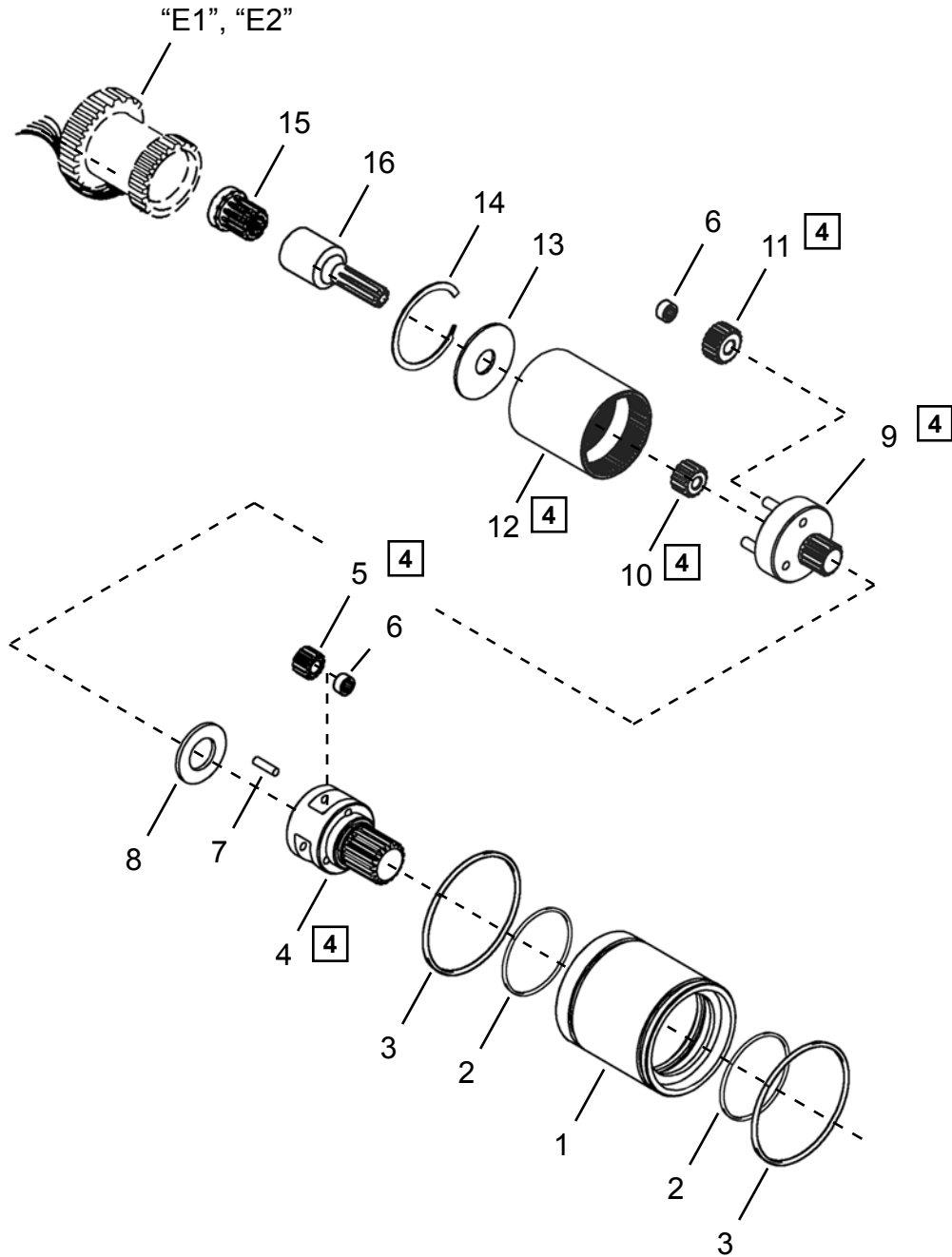
Ref.	Description	#	48ES(E)602ZB	#	48ES(E)702ZB
3	Planet Gear	3	541474 (17T)	3	541475 (21T)
11	Planet Carrier	1	542333	1	542332
13	Planet Cage	1	541279	1	541278

Cleco® Triple Stage Gearing

Models

48ES(E)802ZB
48ES(E)1152ZB
48ES(E)1502ZB

“1”



4 See Service Notes

Cleco®
Triple Stage Gearing

PL12EN-48ES-ZB
10/19/2011

Illustration "I"

Ref	Number	#	X	EN
				Description
1	541438	1		Ring Gear Adapter
2	22598	2	2	O-Ring
3	1012614	2	6	O-Ring
4	Table "I"	1		Planet Cage
5	Table "I"	3	6	Planet Gear
6	541487	6	12	Needle Bearing
7	541480	3	6	Planet Pin
8	542536	1		Thrust Washer
9	Table "I"	1		Planet Carrier
10	Table "I"	1	3	Slip-On Gear
11	Table "I"	3	6	Planet Gear
12	541008	1		Ring Gear
13	542337	1		Washer
14	503405	1	2	Retaining Ring
15	541044	1	2	Pinion Adapter
16	541479	1	2	Extension Pinion

(#) Quantity
(X) Recommended Spare Parts
(T) Teeth

Table "I"

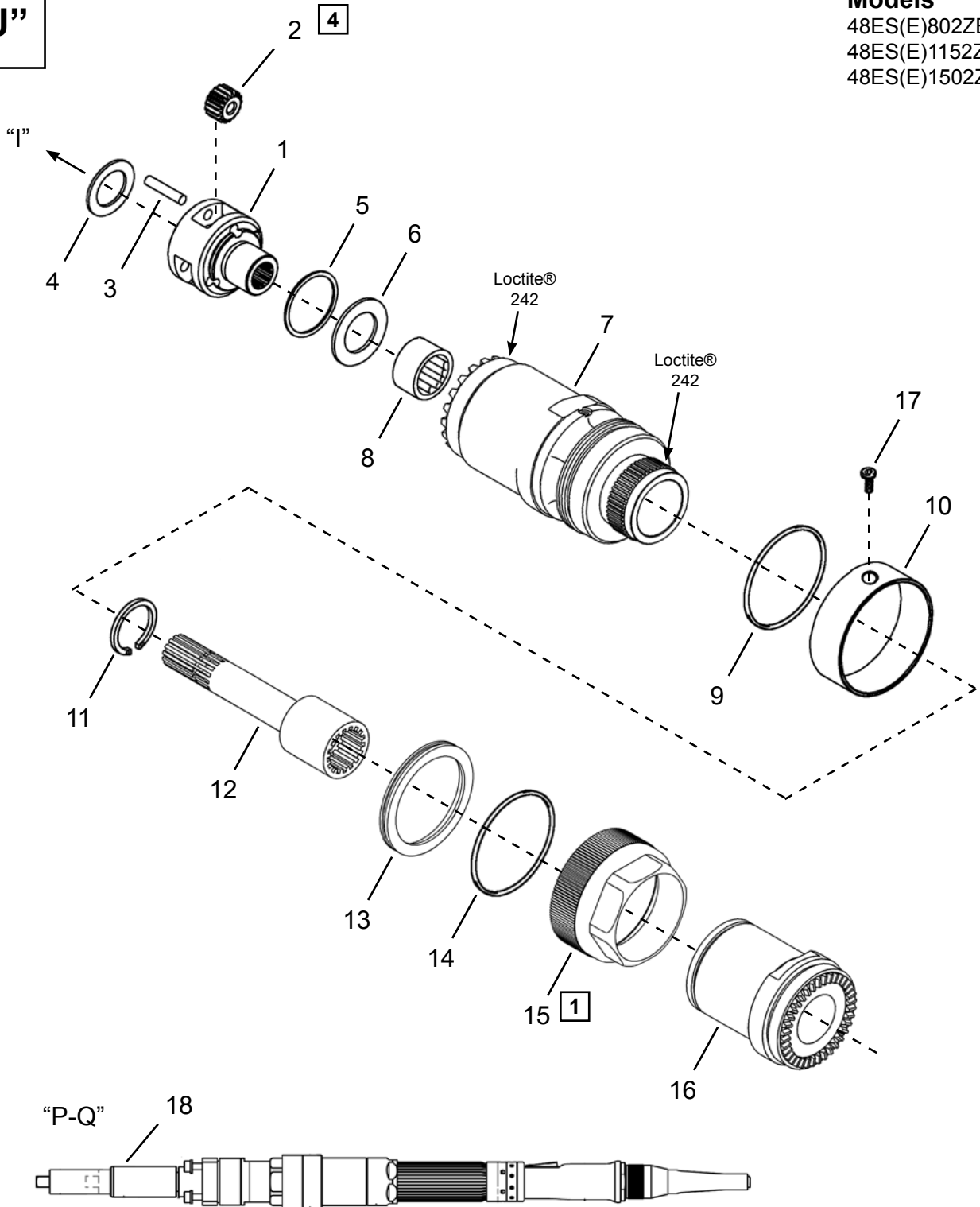
Ref.	Description	#	48ES(E)802ZB	#	48ES(E)1152ZB	#	48ES(E)1502ZB
4	Planet Cage	1	542478	1	542531	1	542478
5	Planet Gear	3	541473 (17T)	3	541472 (14T)	3	541473 (17T)
9	Planet Carrier	1	542328	1	542327	1	542331
10	Slip-On Gear	1	525818		-----		-----
11	Planet Gear	3	541476 (16T)	3	541477 (20T)	3	541477 (20T)

(T) Teeth

Cleco®
Triple Stage (Output) Gearing

Models
48ES(E)802ZB
48ES(E)1152ZB
48ES(E)1502ZB

“J”



1 **4** See Service Notes

Triple Stage (Output) Gearing

Illustration "J"

Ref	Number	#	X	EN
				Description
1	541436	1		Planet Cage
2	542474	3	6	Planet Gear (16T)
3	510754	3	6	Planet Pin
4	510675	1		Thrust Washer
5	800201	1		Retaining Ring
6	502981	1		Thrust Washer
7	542471	1		Gear Case (includes Ref. 8-17)
8	800168	1	2	Needle Bearing
9	30923	1	3	O-Ring
10	542473	1		Cover
11	513003	1	3	Retaining Ring
12	542533	1		Drive Adapter
13	515539	1		Split Ring (includes Ref. 14)
14	526483	1	3	Rubber Band
15	513242	1		Lock Nut
16	542532	1		Mounting Adapter
17	B124Z	1	3	Screw
18	301919	1		2ZB Attachment

(#) Quantity

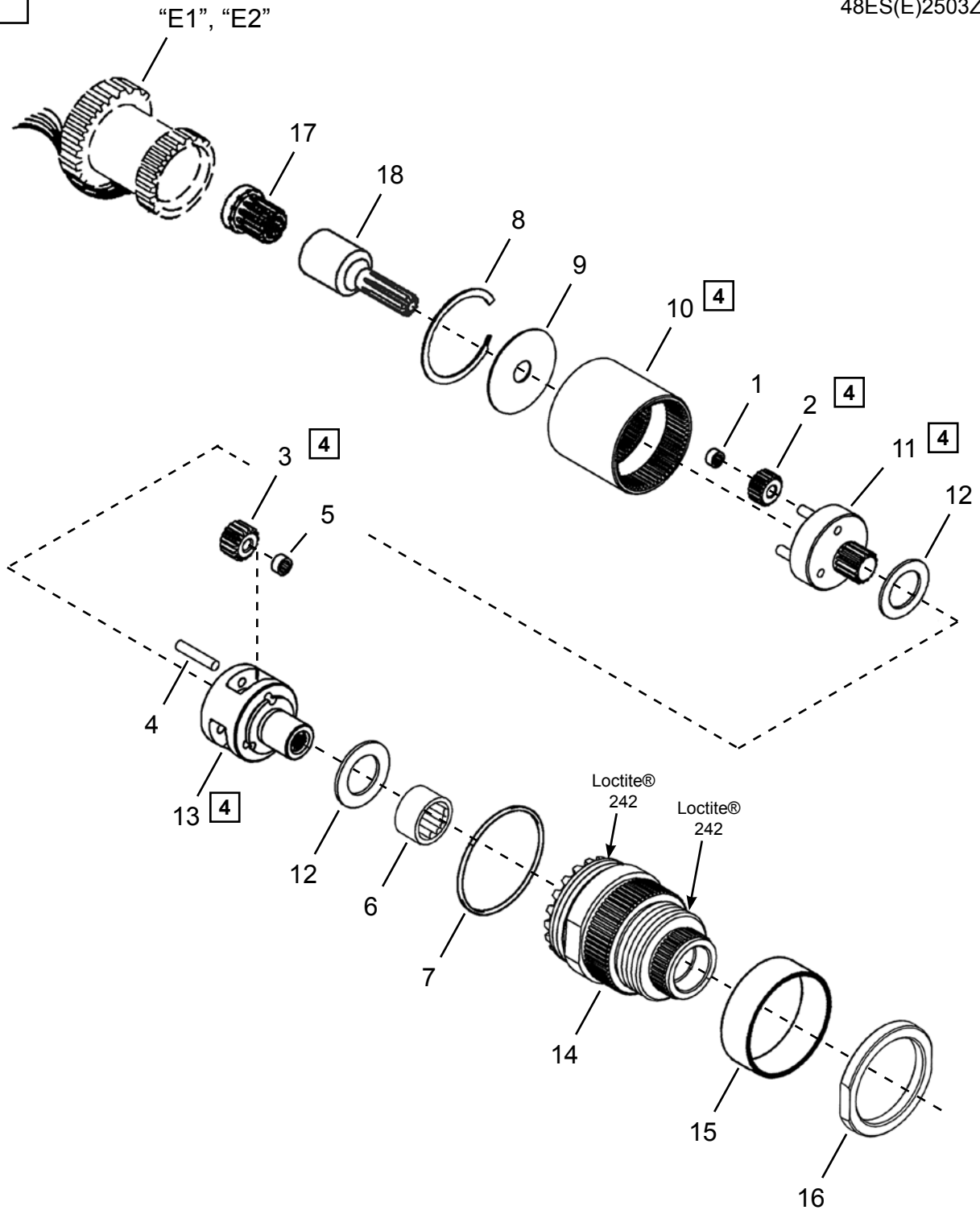
(X) Recommended Spare Parts

(T) Teeth

Cleco® Triple Stage Gearing

Models
48ES(E)1653ZB
48ES(E)2503ZB

“K”



4 See Service Notes

Cleco®
Triple Stage Gearing

PL12EN-48ES-ZB
10/19/2011

Illustration "K"

Ref	Number	#	X	EN
				Description
1	541488	3	6	Needle Bearing
2	541478	3	6	Planet Gear (21T)
3	Table "K"	3	6	Planet Gear
4	541492	3	6	Planet Pin
5	541489	3	6	Needle Bearing
6	800177	1	2	Needle Bearing
7	1010843	1	3	O-Ring
8	541210	1	2	Retaining Ring
9	541185	1		Washer
10	541167	1		Ring Gear
11	Table "K"	1		Planet Carrier
12	510675	2		Thrust Washer
13	Table "K"	1		Planet Cage
14	541045	1		Gear Case (includes Ref. 6)
15	541169	1		Cover
16	207352	1		Lock Nut
17	541044	1	2	Pinion Adapter
18	541043	1	2	Extension Pinion

(#) Quantity
(X) Recommended Spare Parts
(T) Teeth

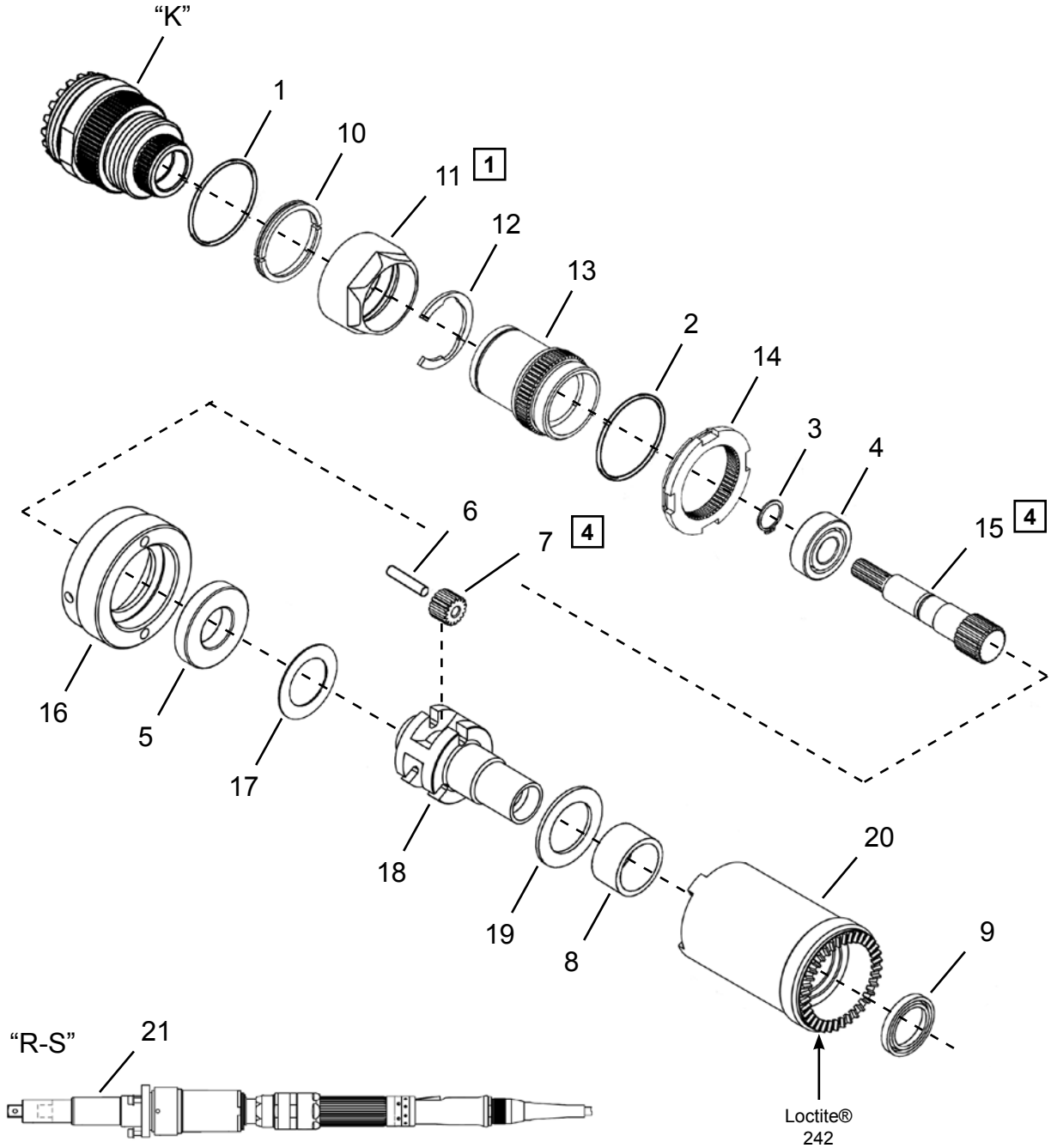
Table "K"

Ref.	Description	#	48ES(E)1653ZB	#	48ES(E)2503ZB
3	Planet Gear	3	541474 (17T)	3	541475 (21T)
11	Planet Carrier	1	542333	1	542332
13	Planet Cage	1	541279	1	541278

Cleco® Triple Stage (Output) Gearing

Models
48ES(E)1653ZB
48ES(E)2503ZB

“L”



1 4 See Service Notes

Triple Stage (Output) Gearing

Illustration "L"

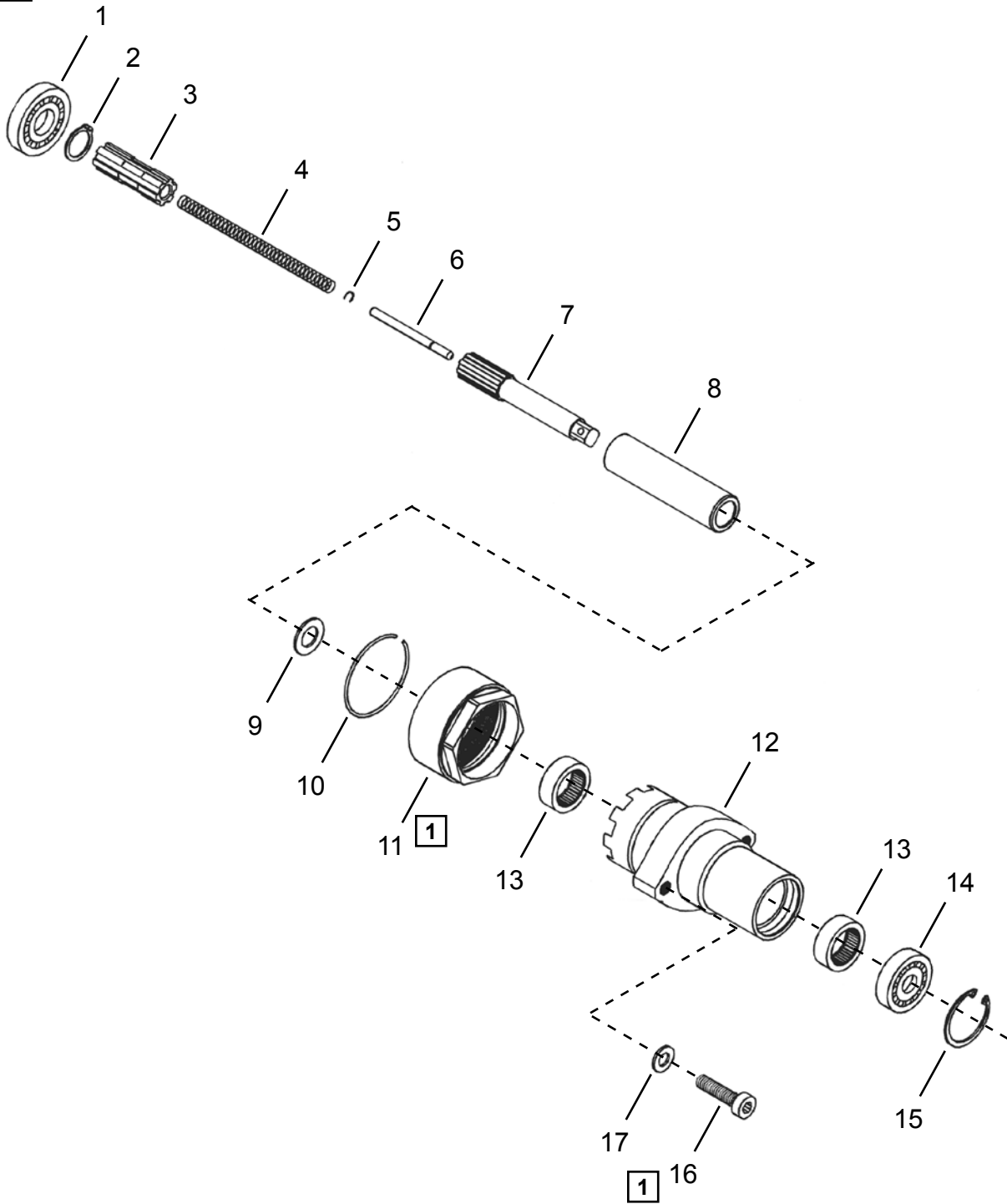
Ref	Number	#	X	EN
				Description
--	542028	1		Gear Assembly
1	526483	1	3	O-Ring
2	30923	1	3	O-Ring
3	800134	1	3	Retaining Ring
4	556	1	2	Bearing
5	10339	1	2	Bearing
6	534057	3	6	Planet Pin
7	534050	3	6	Planet Gear
8	500537	1	2	Needle Bearing
9	525029	1	3	Seal
10	515544	1		Split Ring (includes Ref. 1)
11	510653	1		Lock Nut
12	500644	1		Retaining Ring
13	540091	1		Housing Adapter
14	534049	1		Lock Ring (includes Ref. 2)
15	540081	1		Pinion Gear
16	534052	1		End Cap
17	502991	1		Thrust Race
18	540085	1		Planet Cage
19	502993	1		Thrust Race
20	540079	1		Adapter
21	301920	1		3ZB Attachment

(#) Quantity

(X) Recommended Spare Parts

(T) Teeth

“M”



1 See Service Notes

Cleco®
930300 ZA Attachment

PL12EN-48ES-ZB
10/19/2011

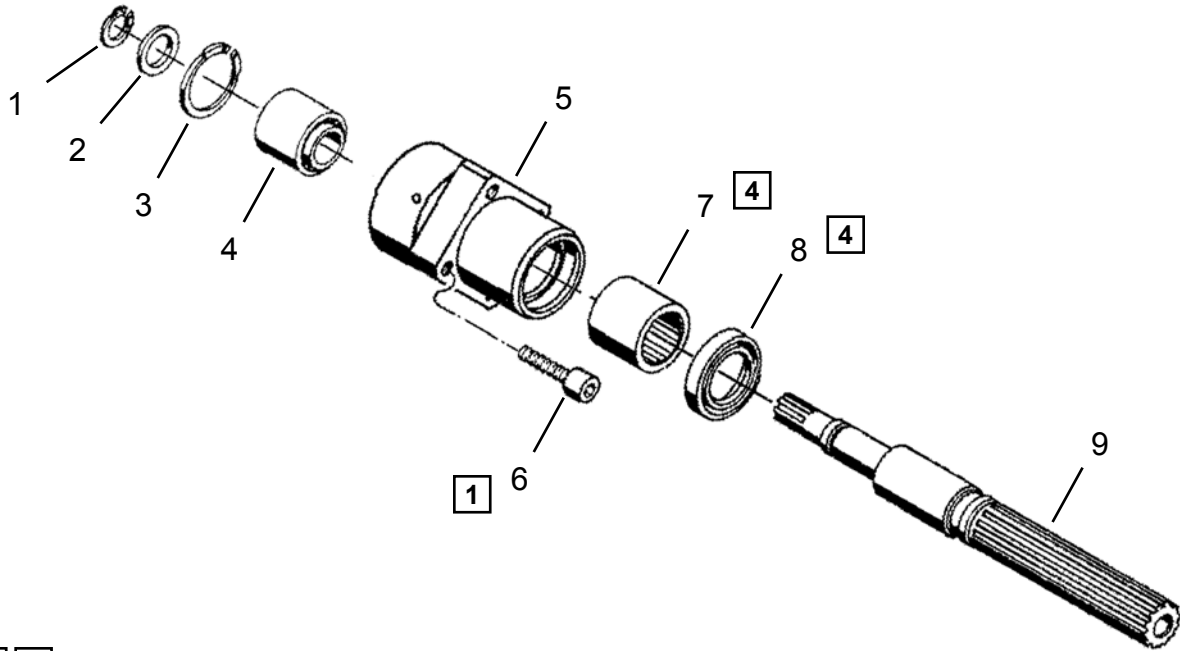
Illustration "M"

Ref	Number	#	X	EN
				Description
1	066810	1	2	Ball Bearing
2	902862	1	3	Retaining Ring
3	930308	1		Driving Shaft
4	930310	1	3	Compression Spring
5	930913	1	3	Retaining Ring
6	930305	1	2	Spring Bolt
7	930304	1		Drive Spindle
8	930306	1		Sleeve
9	930309	1	2	Support Washer
10	923297	1	3	Retaining Ring
11	923175	1		Union Nut
12	930301	1		Spindle Housing Assembly (includes Ref. 13-14-15)
13	416230	2	4	Needle Sleeve
14	253160	1	2	Ball Bearing
15	902184	1	2	Retaining Ring
16	902614	2	4	Cap Screw
17	926169	2	4	Retaining Washer

(#) Quantity

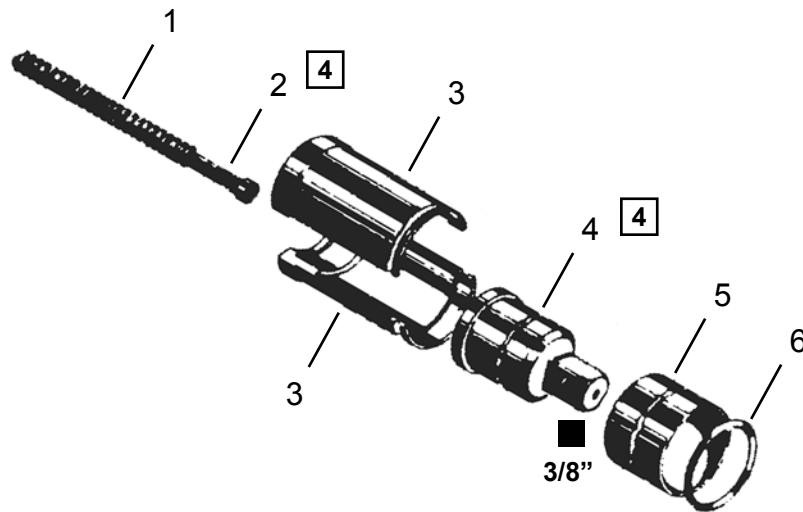
(X) Recommended Spare Parts

“N” 1ZB Attachment - 927222



1 **4** See Service Notes

“O” 1ZB Socket Adapter - 922325



4 See Service Notes

Cleco®
301918 1ZB Attachment

PL12EN-48ES-ZB
10/19/2011

Illustration "N"

Ref	Number	#	X	EN
				Description
1	902034	1	2	Retaining Ring
2	916804	1	2	Support Washer
3	901602	1	2	Retaining Ring
4	927784	1	2	Ball Bearing
5	928993	1		Spindle Housing Assembly (includes Ref. 7-8)
6	901308	4	8	Cap Screw
7	800178	1	2	Needle Sleeve
8	925236	1	3	Shaft Seal
9	935500	1		Drive Spindle

(#) Quantity

(X) Recommended Spare Parts

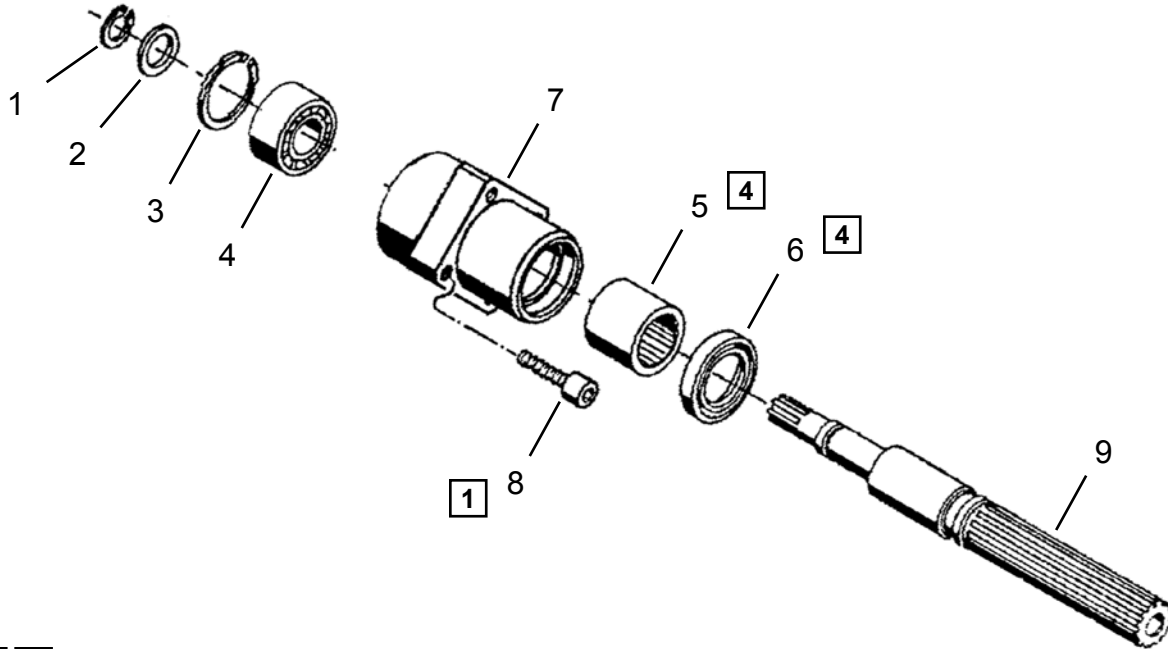
Illustration "O"

Ref	Number	#	X	EN
				Description
1	910679	1	3	Compression Spring
2	910675	1	2	Spring Bolt
3	922323	2	2	Bearing Half
4	922324	1		Socket Adapter Housing
5	922322	1		Sleeve
6	901343	1	3	O-Ring

(#) Quantity

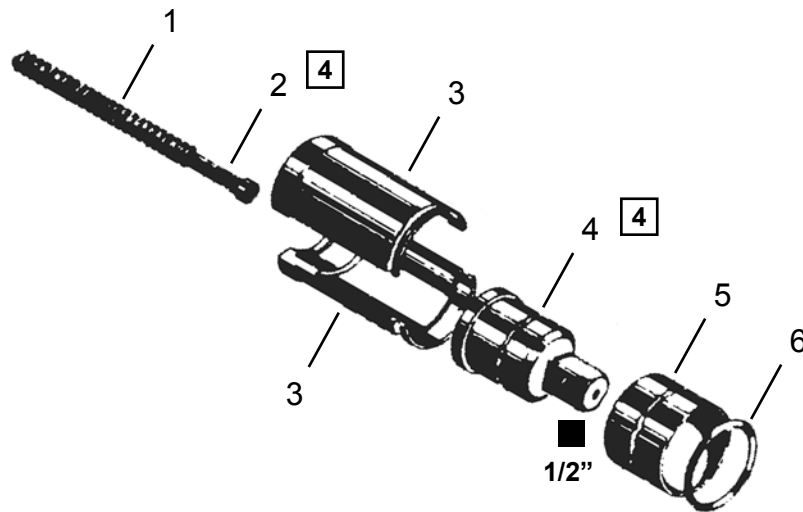
(X) Recommended Spare Parts

“P” 2ZB Attachment - 927227



1 **4** See Service Notes

“Q” 2ZB Socket Adapter - 910609



4 See Service Notes

Cleco®
301919 2ZB Attachment

PL12EN-48ES-ZB
10/19/2011

Illustration "P"

Ref	Number	#	X	EN
				Description
1	933818	1	2	Retaining Ring
2	903474	1	2	Support Washer
3	920543	1	2	Retaining Ring
4	935550	1	2	Ball Bearing
5	918053	1	2	Needle Sleeve
6	926441	1	3	Shaft Seal
7	935870	1		Spindle Housing Assembly (includes Ref. 5-6)
8	900008	4	8	Cap Screw
9	935545	1		Drive Spindle

(#) Quantity

(X) Recommended Spare Parts

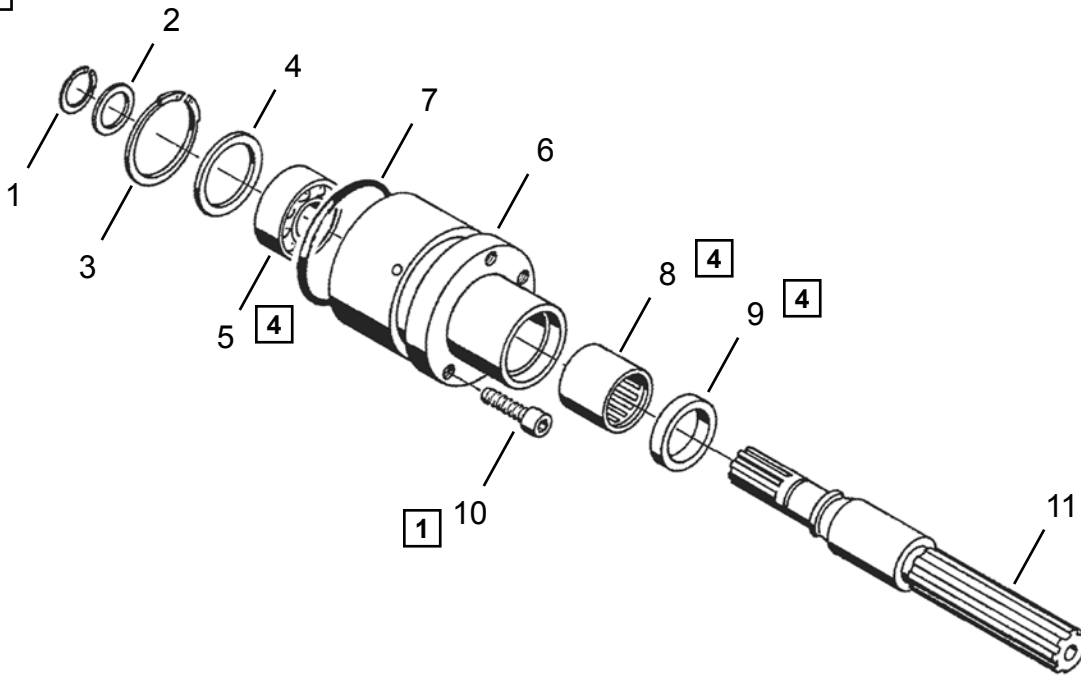
Illustration "Q"

Ref	Number	#	X	EN
				Description
1	910679	1	3	Compression Spring
2	910675	1	2	Spring Bolt
3	910663	2	2	Bearing Half
4	910653	1		Socket Adapter Housing
5	910669	1		Sleeve
6	320914	1	3	O-Ring

(#) Quantity

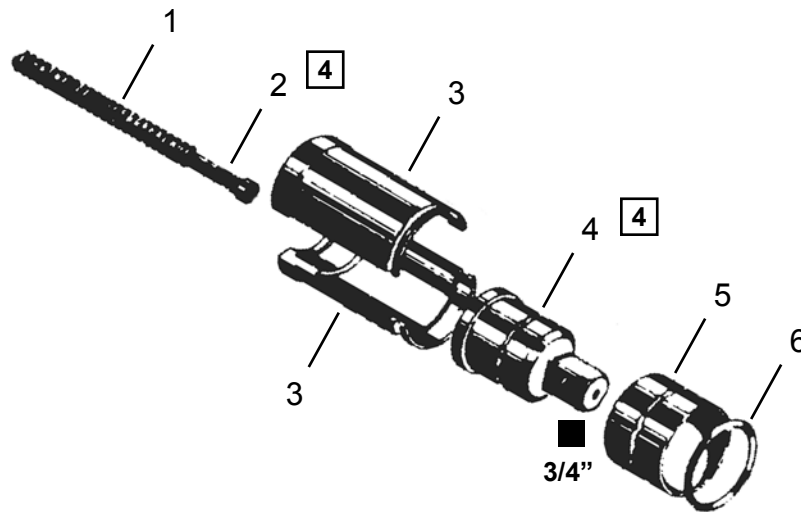
(X) Recommended Spare Parts

“R” 3ZB Attachment - 927233



1 **4** See Service Notes

“S” 3ZB Socket Adapter - 910613



4 See Service Notes

Cleco®
301920 3ZB Attachment

PL12EN-48ES-ZB
10/19/2011

Illustration "R"

Ref	Number	#	X	EN
				Description
1	914957	1	2	Retaining Ring
2	932209	1	2	Support Washer
3	901389	1	2	Retaining Ring
4	914837	1	2	Support Washer
5	200420	1	2	Ball Bearing
6	935871	1		Spindle Housing Assembly (includes Ref. 7-8-9)
7	926860	1	3	O-Ring
8	912094	1	2	Needle Sleeve
9	927959	1	3	Shaft Seal
10	900001	3	6	Cap Screw
11	935583	1		Drive Spindle

(#) Quantity
(X) Recommended Spare Parts

Illustration "S"

Ref	Number	#	X	EN
				Description
1	910679	1	3	Compression Spring
2	910675	1	2	Spring Bolt
3	910665	2	2	Bearing Half
4	910657	1		Socket Adapter Housing
5	910671	1		Sleeve
6	902940	1	3	O-Ring

(#) Quantity
(X) Recommended Spare Parts

Illustration	Reference	Tightening torque	
		Ft-Lbs (in-lbs)	Nm
D1, D2	3	(10-14)	1,1-1,6
	16	25-30	34-41
	19	35-40	47-54
	21 (Swivel)	15-18	20-25
E1, E2	1	(4-6)	0,45-0,68
	3	(4-6)	0,45-0,68
	10	45-50	61-68
F	11	35-40	47-54
G	16	35-40	47-54
H	22	35-40	47-54
J	15	35-40	47-54
L	11	35-40	47-54
M	11	30	40
	16	12	17
N	7	7	10
	11	30	40
P	9	18	25
	11	55	75
R	10	18	25
	13	55	75

2 Transducer Identification

Part Id Stamped on this end

7

Transducers are not interchangeable, check part number.

3 Washer Assembly

Washer Position

2

4 Gear Train Lubrication

541444 - 2 oz. (56 g)
541445 - 1 pound (0.45 kg)

Idler Gears

Grease

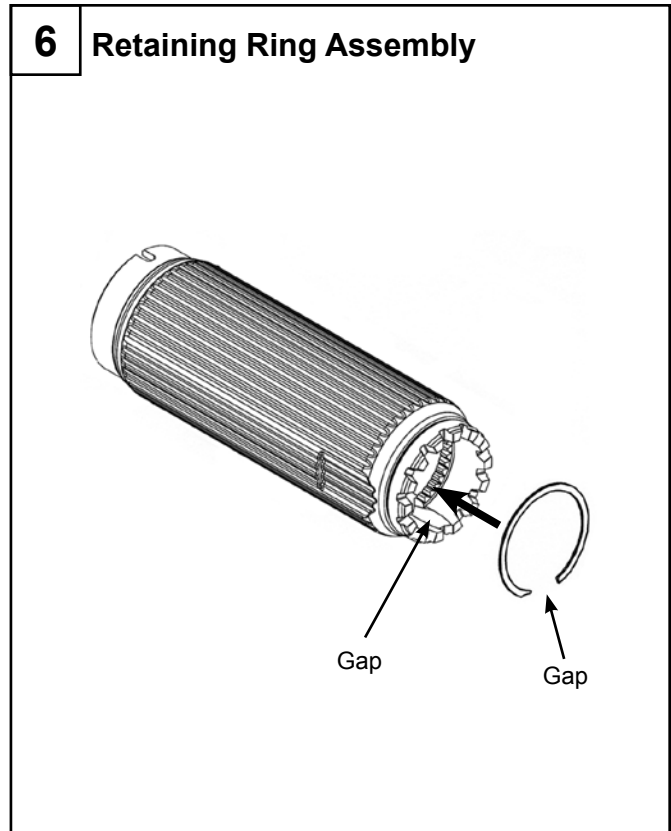
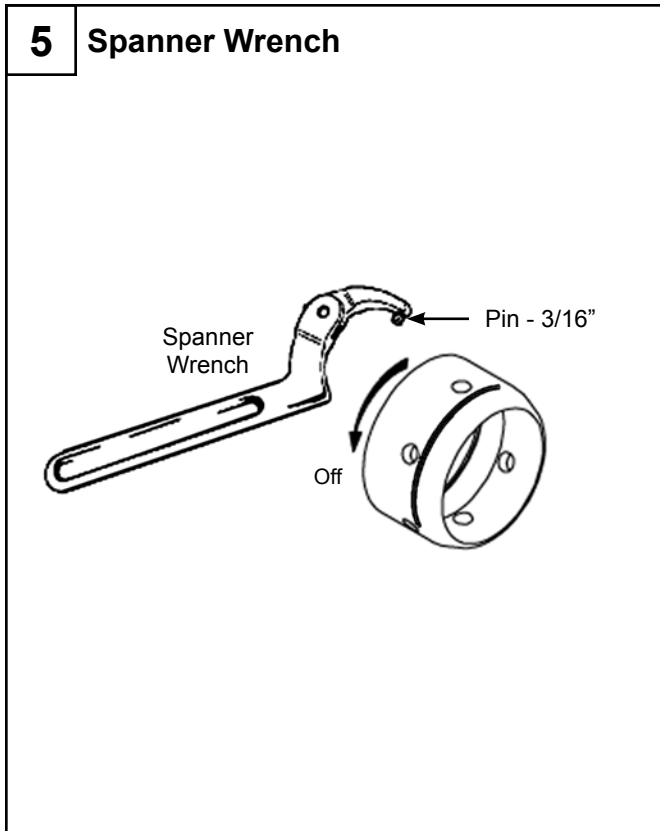
GREASE

Pinion Gears

GREASE

Ring Gears

Service Notes / Tool Memory Parameters



48ES(E) Tool Memory Parameters

Model Number	Max Speed [RPM]	Max Torque [Nm]	Torque Cal [Nm]	Transducer Type	Angle Cal [PPD]	Static Current Factor [Nm/A]
48ES(E)12ZA	4000	12	13.9592	542846-12	21.3333	0.5379
48ES(E)271ZB	1825	27	33.2354	542846-31	46.8595	1.1225
48ES(E)361ZB	1300	36	37.8018	542846-36	66.1219	1.5840
48ES(E)602ZB	860	57	103.2743	542846-100	99.4078	2.3813
48ES(E)702ZB	575	68	102.1637	542846-100	148.8176	3.5649
48ES(E)802ZB	455	82	153.7513	542846-40	188.3146	4.2855
48ES(E)1152ZB	320	115	150.7974	542846-40	264.9600	6.0298
48ES(E)1502ZB	245	144	149.1546	542846-40	345.6000	7.8649
48ES(E)1653ZB	225	165	376.0907	542846-100	381.0632	8.6720
48ES(E)2503ZB	150	248	372.0461	542846-100	570.4674	12.9823

Sales & Service Centers

Note: All locations may not service all products. Please contact the nearest Sales & Service Center for the appropriate facility to handle your service requirements.

Dallas, TX
**Apex Tool Group
Sales & Service Center**
1470 Post & Paddock
Grand Prairie, TX 75050
Tel: 972-641-9563
Fax: 972-641-9674

Detroit, MI
**Apex Tool Group
Sales & Service Center**
2630 Superior Court
Auburn Hills, MI 48326
Tel: 248-391-3700
Fax: 248-391-7824

Houston, TX
**Apex Tool Group
Sales & Service Center**
6550 West Sam Houston
Parkway North, Suite 200
Houston, TX 77041
Tel: 713-849-2364
Fax: 713-849-2047

Lexington, SC
Apex Tool Group
670 Industrial Drive
Lexington, SC 29072
Tel: 800-845-5629
Tel: 803-951-7544
Fax: 803-358-7681

Los Angeles, CA
**Apex Tool Group
Sales & Service Center**
15503 Blackburn Avenue
Norwalk, CA 90650
Tel: 562-623-4457
Fax: 562-802-1718

Seattle, WA
**Apex Tool Group
Sales & Service Center**
2865 152nd Avenue N.E.
Redmond, WA 98052
Tel: 425-497-0476
Fax: 425-497-0496

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**Apex Tool Group
Sales & Service Center**
3990 East Market Street
York, PA 17402
Tel: 717-755-2933
Fax: 717-757-5063

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