



# Spence Engineering

## Installation, operating and maintenance Instructions

### **REflex**

#### Contents

1. General Information
2. Safety Terms
3. Unpacking
4. Installation
5. Commissioning
6. Valve Maintenance
7. Valve Disassembly + Reassembly  
(Incl. spare parts lists and drawings)
8. Pneumatic Actuator Maintenance  
(Incl. spare parts lists and drawings)
9. Electrical Actuator Maintenance  
(Incl. spare parts lists and drawings)
10. Troubleshooting
11. Dimensions & weights
12. REflex Order Code

## 1 General Information

Control valves shall only be used for the appropriate design and operation data.

The body material and nominal pressure of the valve is stamped on the valve body. This data must be compatible with the operating data and the medium.

Each valve has a unique serial number, which can be found on the valve data plate in the box S/N. When ordering spare parts always give the valve serial number (see figure 1 below)

The following Instructions are designed to assist in unpacking, installing and performing maintenance as necessary on REflex control valves.

Product users and maintenance personnel should thoroughly review these instructions prior to installing, operating or performing any maintenance on the valve.

Installation and maintenance should only be performed by trained and qualified specialist staff

To avoid possible injury to personnel or damage to valve parts, WARNING and CAUTION notes must be strictly followed. Modifying this product, substituting non-factory parts or using maintenance procedures other than outlined could drastically affect performance and be hazardous to personnel and equipment and may void existing warranties.

 **WARNING:** Standard industry safety practices must be adhered to when working on this or any other process control product. Specifically, personal protective and lifting devices must be used as warranted.

**Figure 1 Valve Data Plate**



## 2 Terms Concerning Safety

The safety terms **DANGER**, **WARNING**, **CAUTION** and **NOTE** are used in these instructions to highlight particular dangers and/or to provide additional information on aspects that may not be readily apparent.

 **DANGER:** indicates that death, severe personal injury and/or substantial property damage will occur if proper precautions are not taken.

 **WARNING:** indicates that death, severe personal injury and/or substantial property damage can occur if proper precautions are not taken.

 **CAUTION:** indicates that minor personal injury and/or property damage can occur if proper precautions are not taken.

**NOTE:** indicates and provides additional technical information, which may not be very obvious even to qualified personnel.

## 3 Unpacking

1. While unpacking the valve, check the packing list against materials received. Lists describing valve and accessories are in each shipping container.

2. When lifting the valve from shipping container, use the lifting lugs (when attached). Take care to position lifting straps to avoid damage to the tubing and mounted accessories.

 **WARNING:** When lifting a valve using the lifting lugs, be aware that the center of gravity may be above the lifting point. Therefore, support must be given to prevent the actuator from rotating. Failure to do so can cause serious injury to personnel, damage to the valve or nearby equipment.

3. Contact your shipper immediately if there is shipping damage.

4. Should any problem arise, contact your Authorized Circor Energy Representative.

## 4 Installation

Before installing the valve the following items must be considered.

### Installation Space

Be sure to provide proper overhead clearance to ensure maintenance is possible and that there is enough space to remove the actuator/valve trim if necessary. If the valve is installed outdoors, suitable weather protection is required.

### End Caps

Before installation the end caps must be removed from the flanges.

### Cleaning the line

Before installation the line must be cleared of any dirt, welding beads, scale or any other foreign material. A strainer should be installed before the valve to remove any further foreign material.

### Installation Position

Whenever possible the valve should be installed horizontally with the actuator in an upright (12 O-Clock) position, this allows easier maintenance. Vertical Installation is also acceptable, however in this case the actuator mounting pillars must be over each other to support the actuator weight (12 o-clock & 6 o-clock).

### Flow Direction

For two way valves flow direction is indicated by the arrow attached to the valve body.

For mixing valves the outlet is marked with A/B

For diverting valves the inlet is marked with A/B

### Tension on Valve Body

Suitable precautions to prevent any stress or tension on the valve body must be taken.

### Welding the Valve In-line

If welding the valve in line, extreme care must be used to avoid excessive heat build-up in the valve.

### Piping Arrangement

For correct operation of the valve the following minimum pipe distances must be observed and the piping must be straight and free of obstructions.

**Inlet > 5 x pipe diameter**

**Outlet > 10 x pipe diameter**

## Actuator Mounting

Valves are normally delivered with the actuator already mounted. In case of removing or replacing the actuator please refer to section 7.1



**CAUTION** For valves with bellows seal the valve stem must not be twisted, this can damage the bellows seal.

If the actuator is removed, the valve stem can be pushed up due to the medium pressure inside the valve

### Electrical Connection

The electrical connection of the actuator must be performed in accordance to the installation and operating instructions of the actuator.



**WARNING** Always adhere to all relevant safety instructions when working on electrical connections.

Before connecting check that line current, voltage and frequency correspond to the ones given on the actuator data plate.

### Pneumatic Connection

Each valve should be provided with a separate air pressure regulator to avoid interference from an external source.



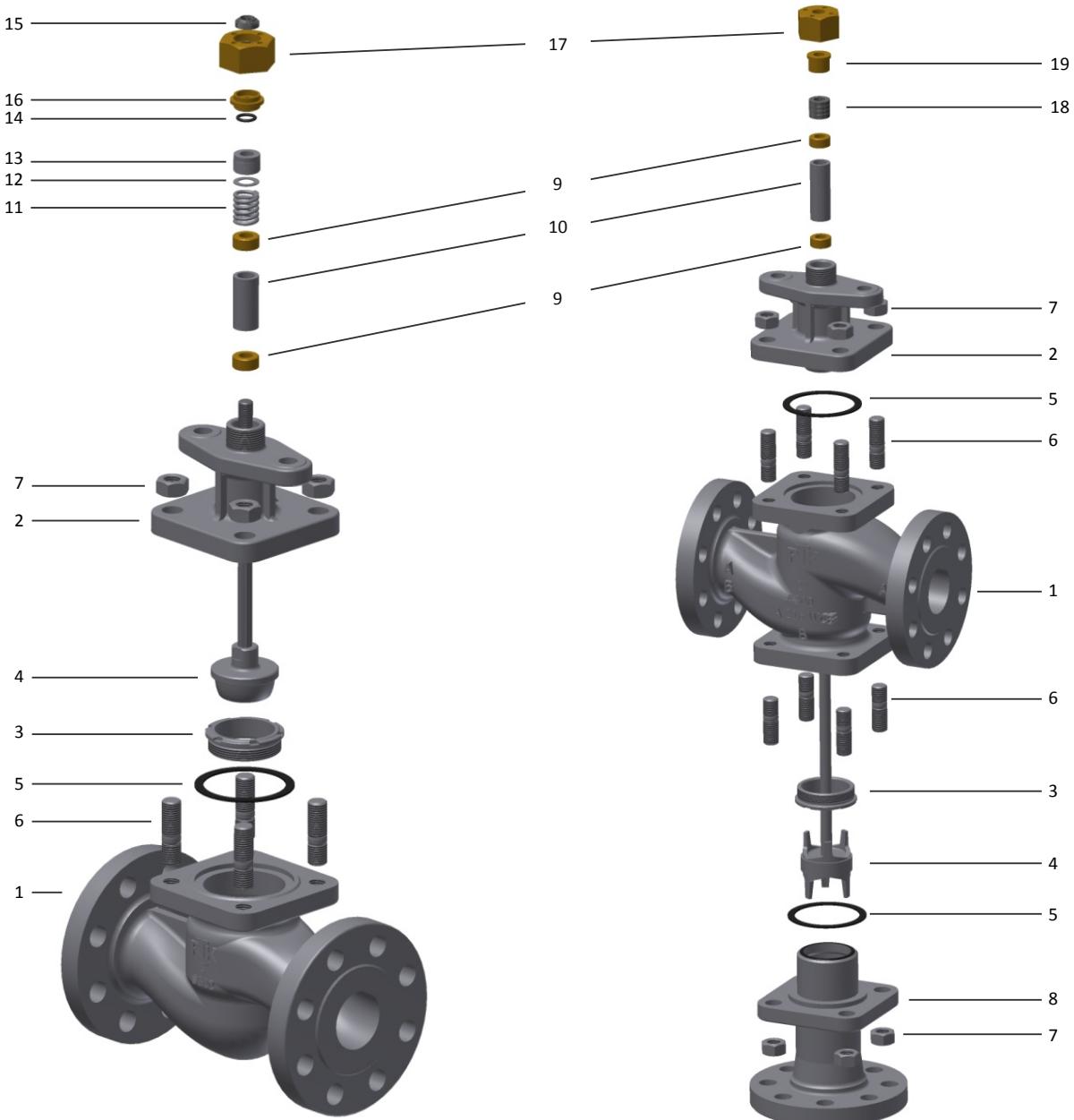
**CAUTION** Always use clean, dry instrument air, avoiding moisture, oil or dust. In particular positioners require clean dry instrument air. Please refer to the appropriate actuator and/or positioner data sheet for connections, maximum air supplies and maintenance instructions.





## 7 Valve Disassembly, Replacing Packing and Trim, and Valve Reassembly

**Figure 3 Typical 2 way (PTFE/Graphite packing) and 3 way (Graphite packing) valve**

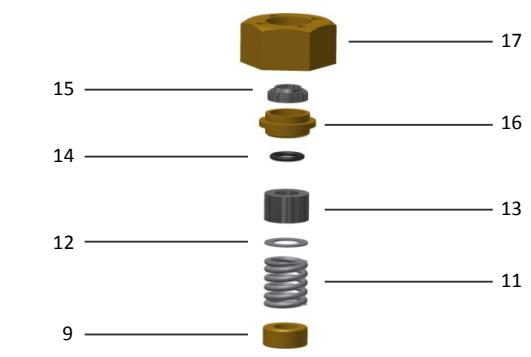


**Table 3 Parts Description**

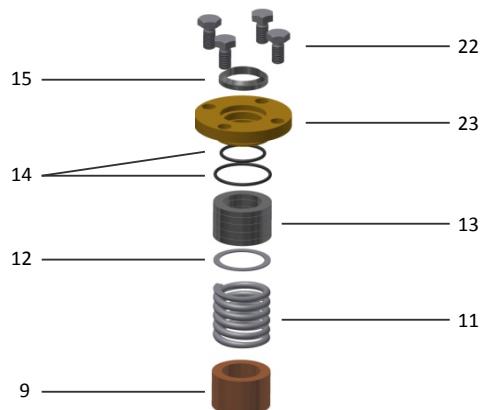
Item	Description	Item	Description
1	Body	9	Guide Bushing
2	Bonnet	10	Spacer
3	Seat Ring	11	Spring
4	Plug Assembly	12	Washer
5	Bonnet Gasket	13	Packing Rings
6	Stud	14	O-Ring
7	Nut	15	Wiper Ring
8	B-Flange	16	Packing Follower
		17	Clamping Nut
		18	Packing Rings
		19	Packing Follower



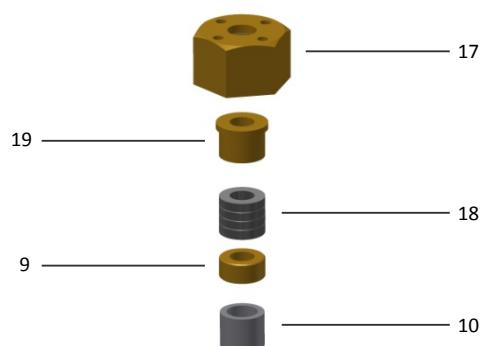




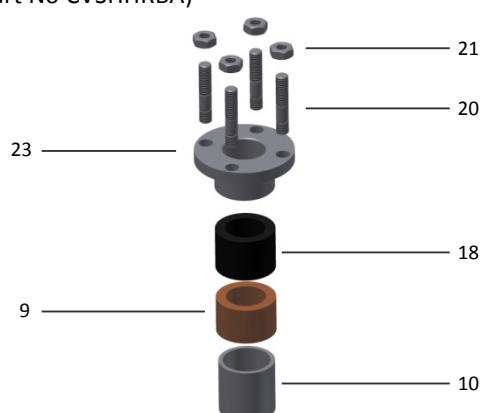
**PTFE/Graphite 1/2" - 4" Class 600 & 900 Stem 1/2"**  
(Part No CVSHHRBE)



**PTFE/Graphite 1 1/2" - 4" Class 600 & 900 Stem 1 1/4"**  
(Part No CVSQRLRBE)



**Graphite 1/2" - 4" Class 600 & 900 Stem 1/2"**  
(Part No CVSHHRBA)



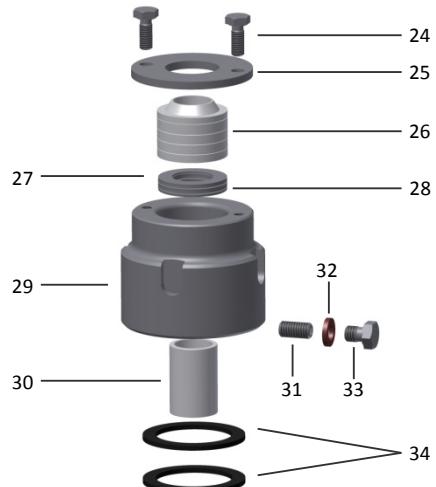
**Graphite 1 1/2" - 4" Class 600 & 900 Stem 1 1/4"**  
(Part No CVSQRLRBA)

#### Bellows Seal Packing

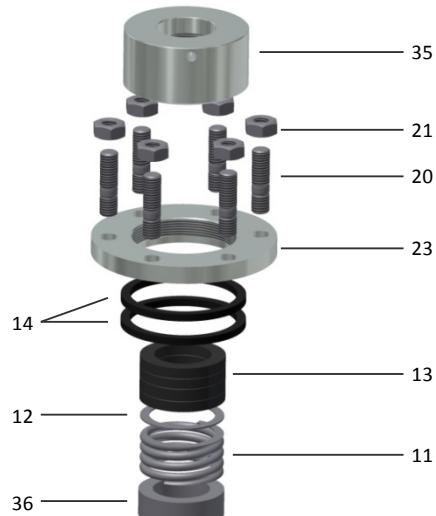
Remove the safety stuffing box, loosen screw (33) and set screw (31)

Carefully disassemble the valve as directed in section 7.1

Insert the new plug into the seat and then install the bonnet onto the valve body. Insert set screw (31) to prevent the bellows seal from twisting then tighten screw (33) Lastly, assemble the new safety stuffing box.



**Bellows Seal 1/2" - 6" Class 150 Stem 1/2"**  
(Part No CVSHHLOI)

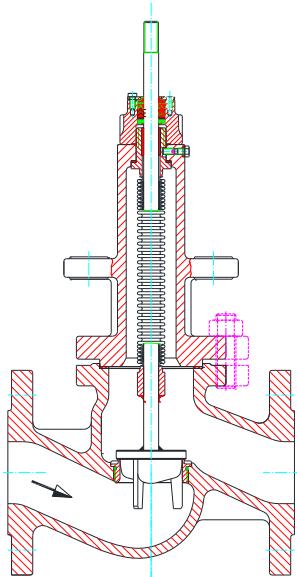


**Bellows Seal 3" - 12" Class 150 Stem 1 1/4"**  
(Part No CVSQQLLOES)

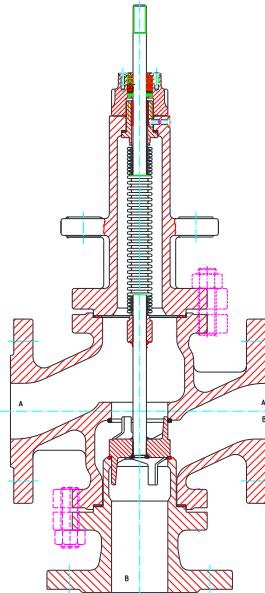




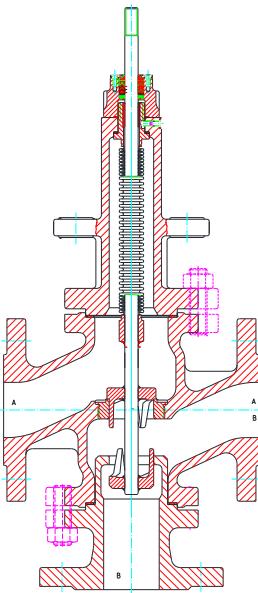
**3" – 6" 150/300# Stem  $\frac{1}{2}"$   
Bellows Seal (PV6314)**



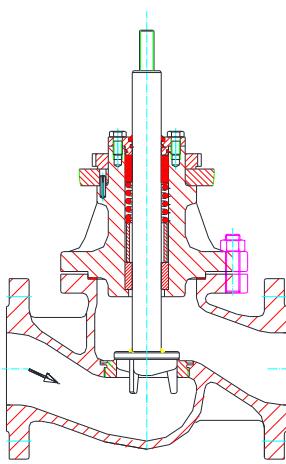
**3" – 6" 150/300# Stem  $\frac{1}{2}"$   
Bellows Seal (PV6324)**



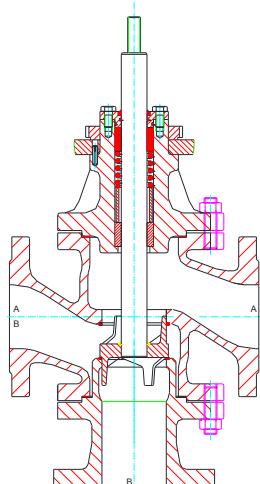
**3" – 6" 150/300# Stem  $\frac{1}{2}"$   
Bellows Seal (PV6334)**



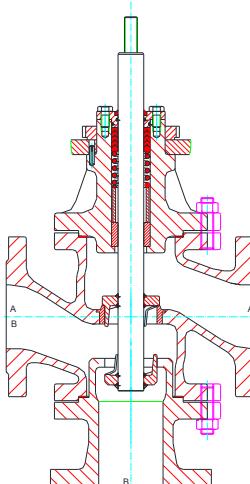
**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6411)**



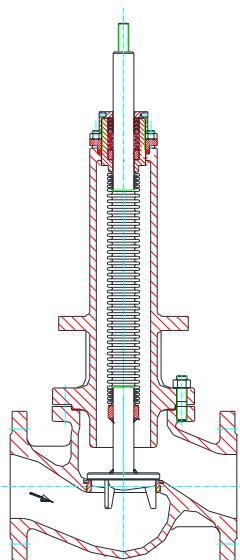
**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6421)**



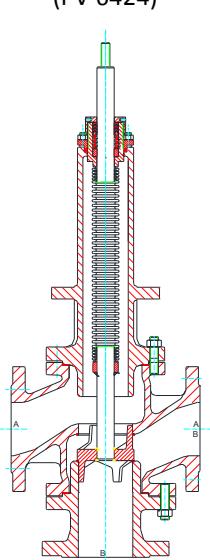
**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6431)**



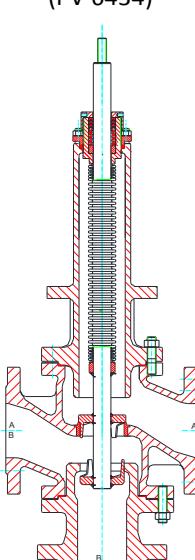
**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6414)**



**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6424)**



**1 $\frac{1}{2}"$  – 12" 150/300# Stem  $1\frac{1}{4}"$   
(PV 6434)**

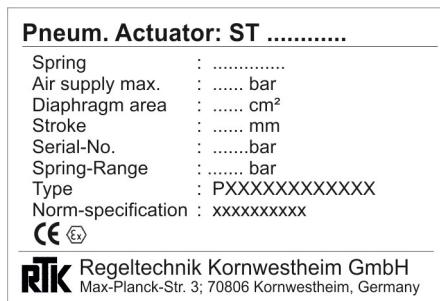


**Table 5 Valve Materials**

Item	Item Description	Material	Material Spec.	(ANSI Equivalent)	Part Number
1	Body	Carbon Steel Stainless Steel Chrome Moly	ASTM A216 Gr WCB ASTM A351 Gr CF8M ASTM A217 Gr WC9		BVG...
2	Bonnet	Carbon Steel Stainless Steel Chrome Moly	ASTM A216 Gr WCB ASTM A351 Gr CF8M ASTM A217 Gr WC9		BVD...
3	Seat Ring	Stainless Steel	1.4571	(AISI 316 Ti)	FSIR...
4	Plug Assembly	Stainless Steel			BVK...
4.1	Plug	Stainless Steel	1.4122		FKKP...
4.2	Stem	Stainless Steel	1.4571	(AISI 316 Ti)	
	Bellows Seal	Stainless Steel	1.4571	(AISI 316 Ti)	
5	Gasket	Graphite + S.S.	Graphite + 1.4401		FDIF...
7	Nut	Carbon Steel Stainless Steel Chrome Moly	CK 35YK A2-70 21CrMoV57 GA		
6	Stud	Carbon Steel Stainless Steel Chrome Moly	CK 35YK A2-70 24CrMo5 G		
8	B-Flange (3 way)	Carbon Steel Stainless Steel	ASTM A216 Gr WCB ASTM A351 Gr CF8M		BVB...

## 8. Pneumatic Actuator ST6115/ST6135/ST6160/ST6175

Each actuator has a unique serial number which can be found on the data plate affixed to the actuator. When ordering spare parts, or replacements always give the actuator serial number.



### 8.1 Disassembly of the Actuator (refer to figures 6 & 7)

Remove actuator from the valve as described in section 7.1.

Loosen the set screw (18) on the arrester (17) then loosen the nut (19). Remove the pillars (21). With the use of a locknut (tighten two nuts against each other, then by unscrewing the bottom one the pillar can be removed) Using a vernier caliper measure the distance between the underside of the parallel guide (20) and the end of the actuator stem (16) this distance must be noted for readjustment later. Loosen and remove the nut (19) parallel guide (20) and the arrester (17) Mark the upper (6) and lower casings (11) for reassembly later. Remove the regular casing bolts (7) gradually, alternately loosen the nuts on the remaining long casing bolts (7) to allow decompression of actuator springs.



**Warning** As the springs in the actuator are compressed this creates a force between the upper and lower casings, care must be taken when removing the casing bolts.

### 8.2 Replacing the Diaphragm

#### 8.2.1 Spring Closed Actuator

Remove upper casing (6) then remove the springs (10). Take out the diaphragm assembly (consisting of diaphragm (4), actuator stem (16) diaphragm ring (2) and diaphragm plate (3). Clamp the diaphragm plate in a vice and unscrew the actuator stem (16) again with the use of a locknut. Remove the old diaphragm and replace with a new one. Place the diaphragm plate (3) on the diaphragm, then turn the diaphragm over and place the diaphragm ring on the other side, apply Loctite 270 to the thread on the actuator stem (16) then screw this into the diaphragm plate (3) by hand.

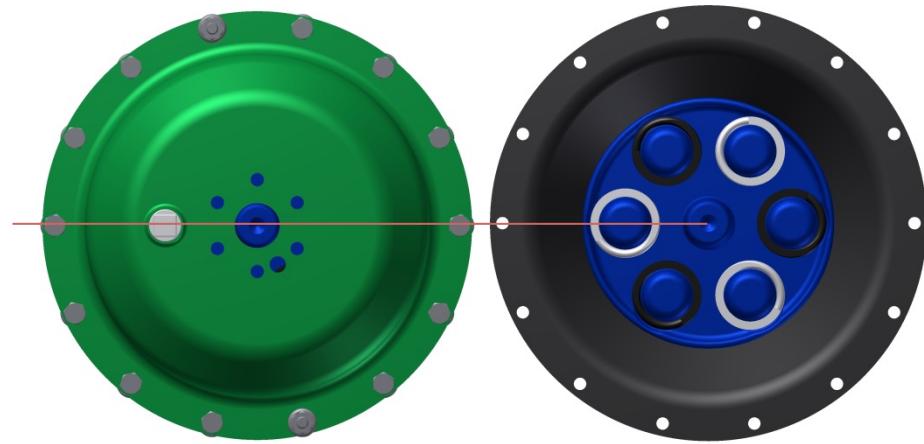
Important, one of the bolting holes of the diaphragm must be in line with one of the spring holders on the diaphragm plate and the center of the diaphragm plate.

Then fully tighten the actuator stem.

Unscrew the 3 bolts (12) fastening the connection flange to the lower casing (11). Remove the seal (14) from the connection flange and replace with the new seal. Place the lower casing over the connection flange (paying attention that the holes line up) Apply Loctite 270 on the thread of the 3 bolts, then tighten them (torque 11.8 ft-lbs/16 Nm)

Place the diaphragm assembly in the lower casing, paying attention that a bolting hole in the diaphragm, a hole in the lower casing, the air connection in the lower casing, the spring holder on the diaphragm plate and the center of the diaphragm plate are in line (see figure 4). Replace the springs, pay attention to the correct spring position (see figure 8). Then reassemble the actuator as described in section (8.4)

**Figure 4**



### 8.2.2 Spring Open Actuator

Remove upper casing (6). Take out the diaphragm assembly (consisting of diaphragm (4), actuator stem (16) diaphragm ring (2) and diaphragm plate (3), then remove the springs (10). Clamp the diaphragm plate in a vice and unscrew the diaphragm ring bolt (5) clamping the diaphragm between the diaphragm plate and the diaphragm ring (see figure 5)

**Figure 5**



Remove the old diaphragm and replace with a new one. Place the diaphragm plate (3) on the diaphragm, then turn the diaphragm over and place the diaphragm ring on the other side, apply Loctite 270 to the thread on the bolt then screw this into the diaphragm plate by hand.

Important, one of the bolting holes of the diaphragm must be in line with one of the spring holders on the diaphragm plate and the center of the diaphragm plate.

Then fully tighten the bolt.

Unscrew the 3 bolts (12) fastening the connection flange to the lower casing (11). Remove the seal (14) from the connection flange and replace with the new seal. Place the lower casing over the connection flange (paying attention that the holes line up) Apply Loctite 270 on the thread of the 3 bolts, then tighten them (torque 11.8 ft-lbs/16 Nm)

Place the upper casing upside down on a work bench, then place the diaphragm assembly in upper casing paying attention that a hole in the diaphragm, a hole in the upper casing, the air connection in the upper casing, the spring holder on the diaphragm plate and the centre of the diaphragm plate are in line. Replace the springs, pay attention to the correct spring position (see figure 8).

Then reassemble the actuator as described in section (8.4)

### **8.3 Changing one or more springs**

Remove the actuator from the valve as described in section 7.1

#### **8.3.1 Spring Closed Actuator**

Remove the upper casing. Change the spring(s), the end of the spring should be facing the outside of the casing (for the correct spring position see figure 8). Then reassemble the actuator as described in section 8.4.

#### **8.3.2 Spring Open Actuator**

Remove the upper casing. Take out the diaphragm assembly and remove the old springs.

Place the upper casing upside down on a work bench, then place the diaphragm assembly in the upper casing paying attention that a hole in the diaphragm, a hole in the upper casing, the air connection in the upper casing, the spring holder on the diaphragm plate and the center of the diaphragm plate are in line. Replace the springs, pay attention to the correct spring position (see figure 8).

Then reassemble the actuator as described in section (8.4)

### **8.4 Reassembly of the Actuator**

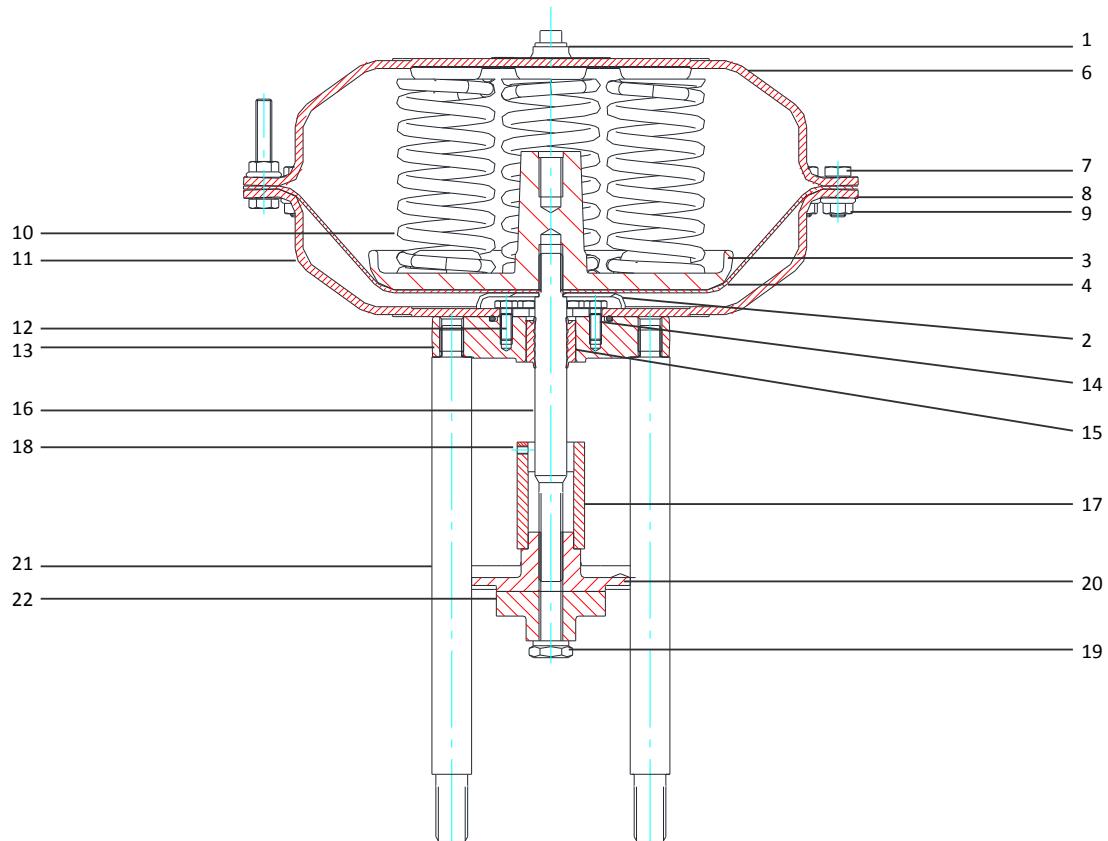
Fit the upper casing (ensure that the air connections in the upper and lower casings are over each other) Also ensure that the marks made on the upper and lower casings (section 8.1) line up. First mount and tighten (alternately) the long casing bolts (don't fully tighten) then mount and tighten the regular casing bolts, finally fully tighten the long casing bolts. The max tightening torque is shown in the table below.

**Table 6 Tightening Torque**

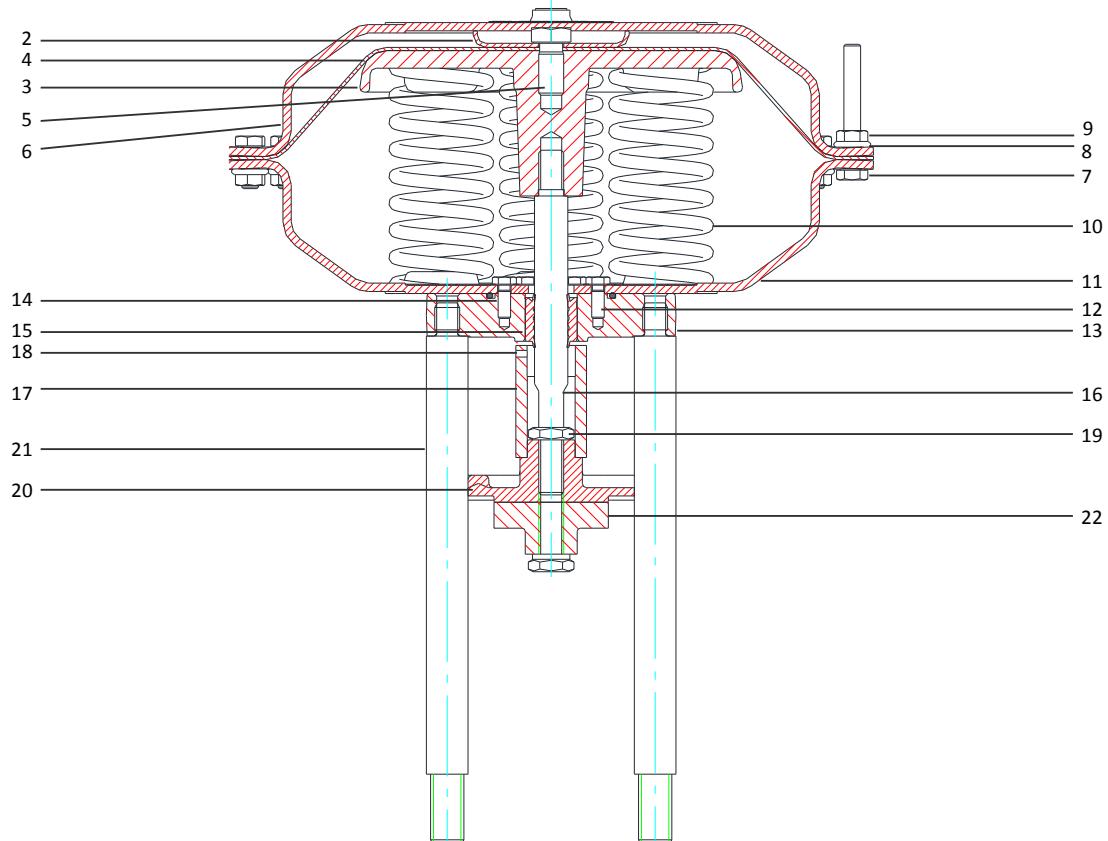
<b>Bolting Material</b>	<b>Torque in ft-lbs (Nm)</b>	
	ST6115, ST6135, ST6160 (M6)	ST6175 (M8)
Steel	8.85 (12)	19.2 (26)

Mount the arrester (17) and nut (19) on the actuator stem (16), then screw the parallel guide onto the actuator stem. Using vernier calipers ensure that the distance between the underside of the parallel guide (20) and the end of the actuator stem (16) is the same as measured in section 8.1 (disassembly of the actuator) The nose on the parallel guide (20) must be on the same side as the air connectors on the connection flange. Screw in the pillars (21), then tighten the nut and the set screw (18) on the arrester (17). Mount the actuator on the valve as described in section 7

**Figure 6 Reverse Acting (Spring Closed)**



**Figure 7 Direct Acting (Spring Open)**

















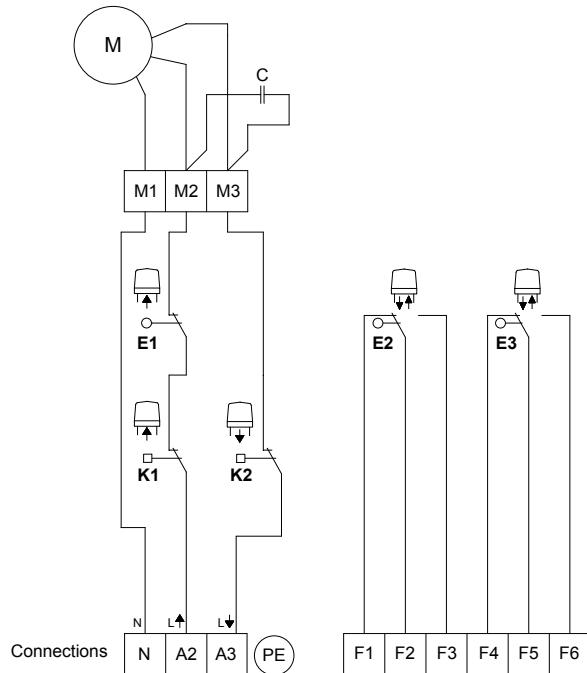




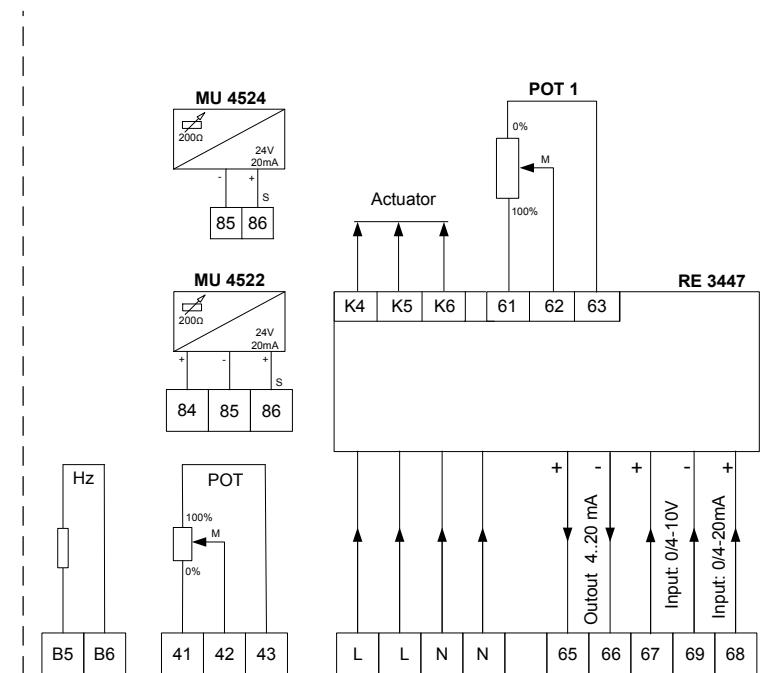


## Standard REact 15 E Connection Diagrams

### Single Phase AC



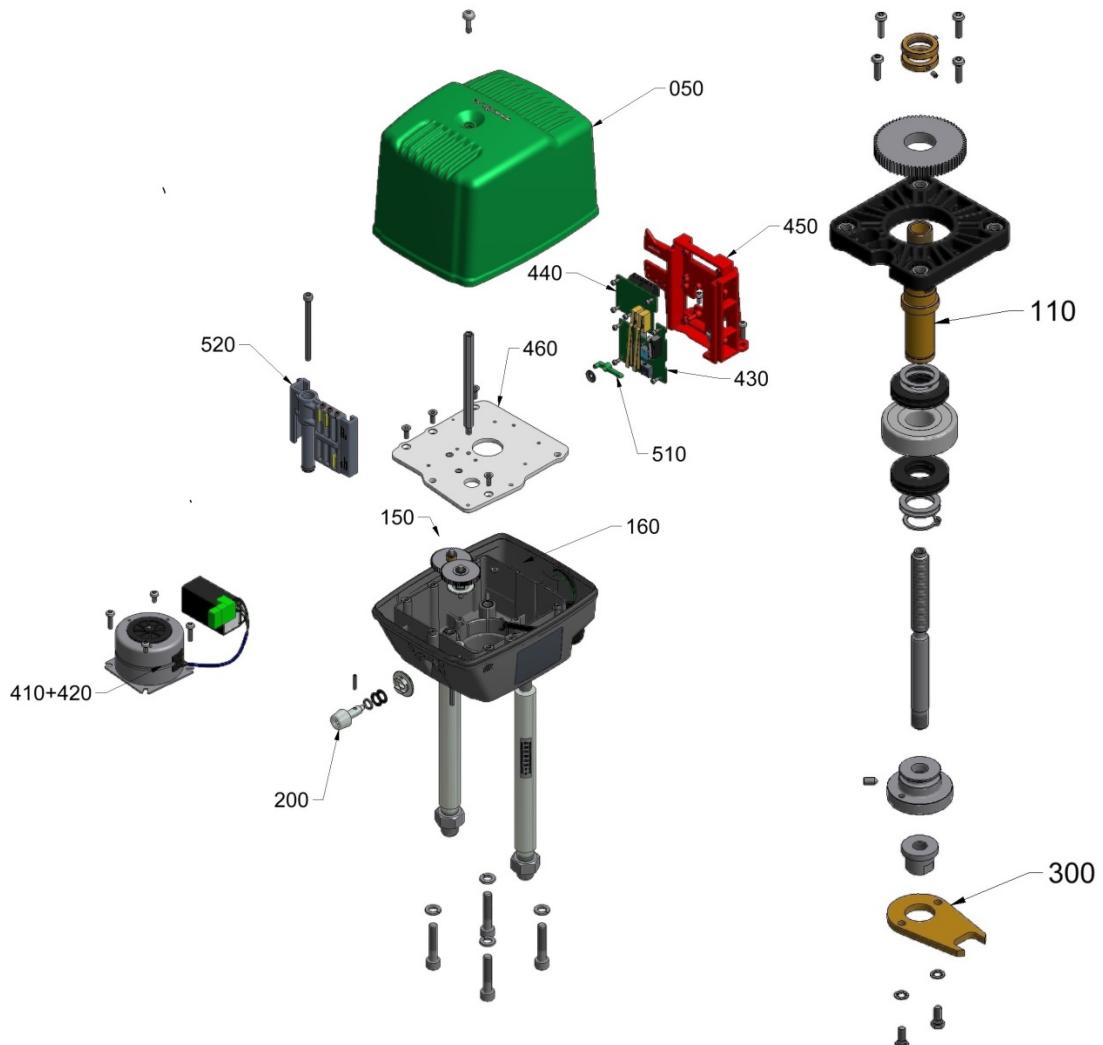
### Accessories



- K1 force switch (open direction)
- K2 force switch (closed direction)
- E1 limit switch (open position)
- E2 limit switch (Intermediate position)
- E3 limit switch (Intermediate position)
- Pot potentiometer
- Hz heating element
- MU452. position transducer
- RE 3447 digital valve positioner
- C capacitor

**Table 8 Spare parts list REact**

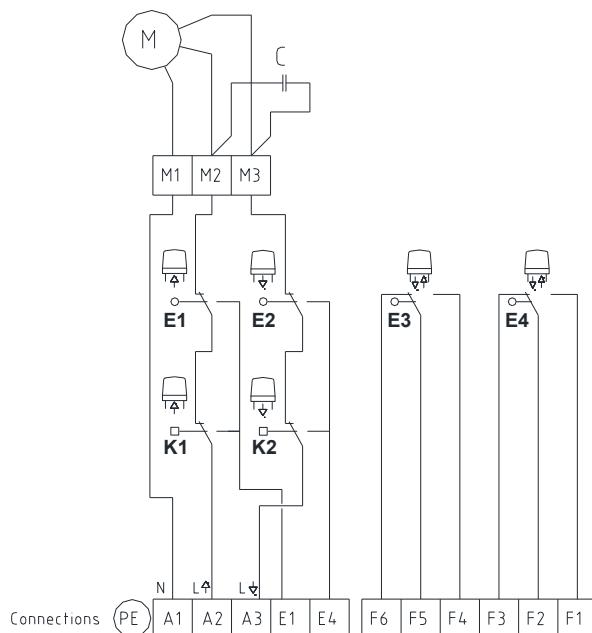
Item	Description	Part no.
050	cover	CADH15R00009
110	stem nut group	CSPT15R00009
150	gear wheel 2	CZRA15R20009
160	gear wheel 1	CZRA15R10009
200	hand wheel	CRAH15R00009
300	coupling	CKUK51120009
410 + 420	motor + capacitor + motor plug (please state voltage and frequency required)	CMOK15RB.....
420	capacitor	GKDS00200009
430	limit switch PCB	CPLE15R00009
440	bracket	CTRA15R00009
450	motor plate	CMOP15RB0009
510	switching clutch	CFEB15R00009
520	cam plate	CFFE15R00009



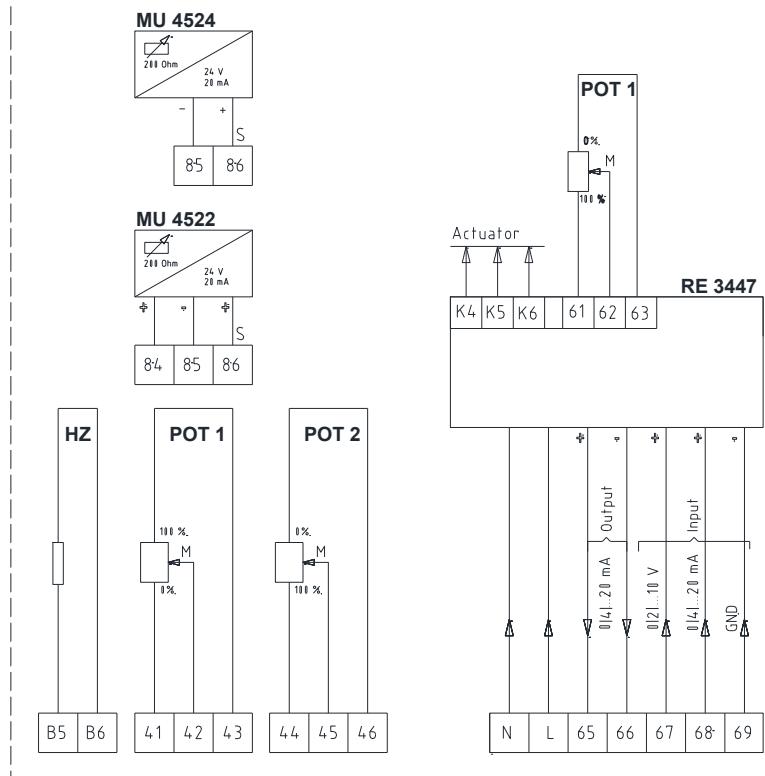
When ordering spare parts please state actuator type and serial number (see data plate). When ordering motors and capacitors please state power supply.

## Standard ST5112 Connection Diagrams

### Single Phase AC



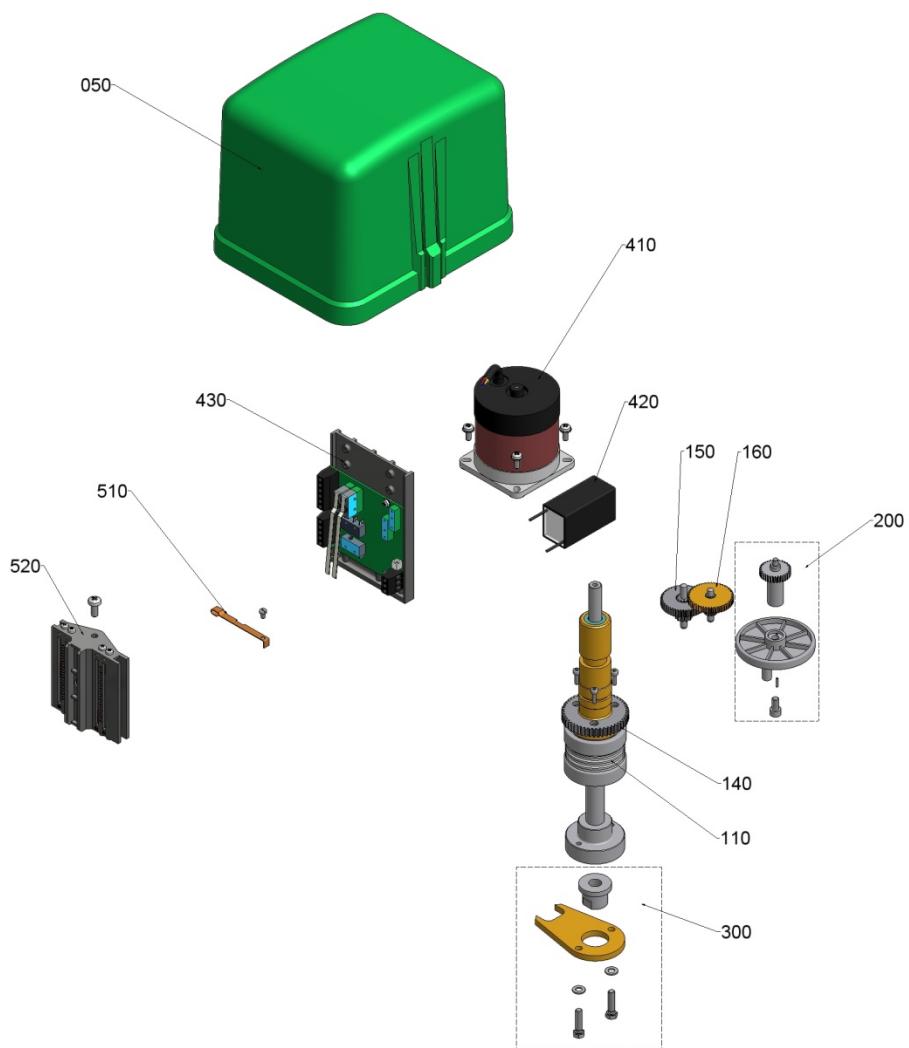
### Accessories



- K1 force switch (open direction)
- K2 force switch (closed direction)
- E1 limit switch (open position)
- E2 limit switch (closed position)
- E3 limit switch (Intermediate position)
- E4 limit switch (Intermediate position)
- Pot potentiometer
- Hz heating element
- MU452. position transducer
- RE 3447 digital valve positioner
- C capacitor

**Table 9 Spare parts list ST5112**

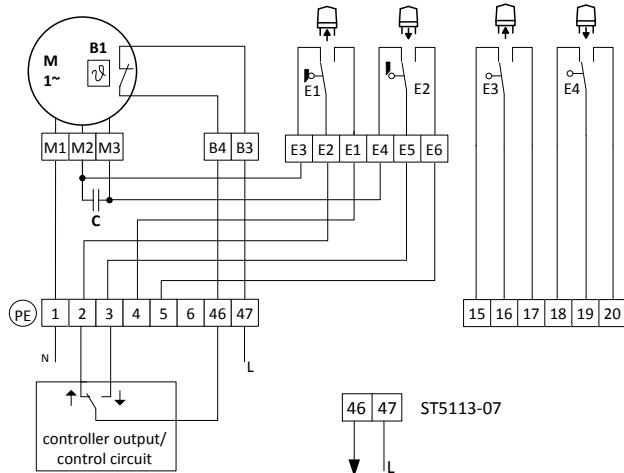
Item	Description	Part no.
050	cover	CADH51120009
110	stem nut group	CSPT12000009
140	gear wheel 0	CZRA51120009
150	gear wheel 2	CZRA51122009
160	gear wheel 1 (ST5112-32, -33, 34) up to 9. Jan. 2007 (ST5112-33, 34) from 10.Jan.2007 (ST5112-32) from 10.Jan.2007	CZRA51121009 -32, -33, -34 CZRA51121109 -33, -34 CZRA51121209 -32
200	hand wheel	CRAH12000009
300	coupling	CKUK51120009
410 + 420	motor + capacitor (please state voltage and frequency required)	CMOK -32 CMOK -33 CMOK -34
420	capacitor	GKDS -32 GKDS -33 GKDS -34
430	limit switch PCB	CPL27220009
510	switching clutch	CFEB51120009
520	cam plate	CFFE51120009



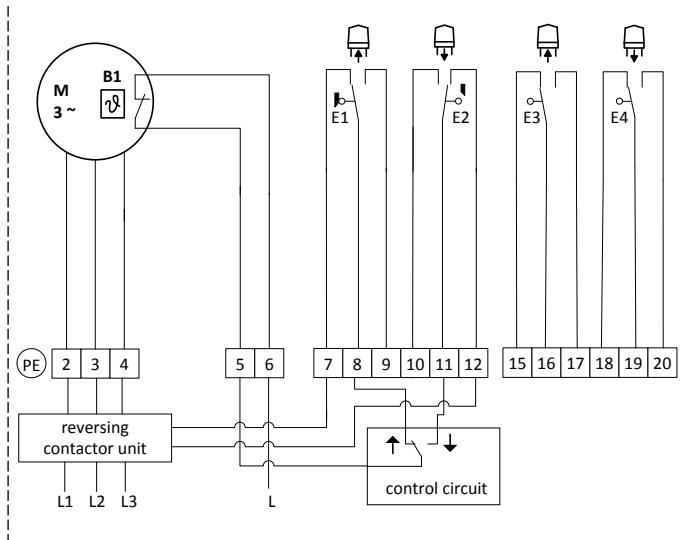
When ordering spare parts please state actuator type and serial number (see data plate). When ordering motors and capacitors please state power supply.

## Standard ST5113 Connection Diagrams

### Single Phase AC

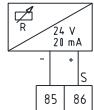


### 3 Phase AC

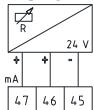


## Accessories

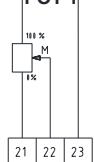
MU 4524



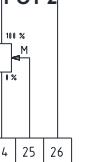
MU 4522



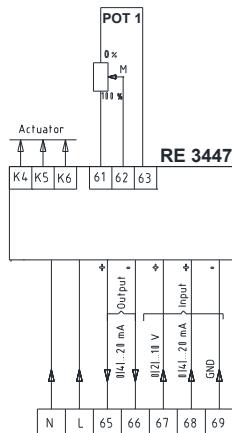
POT 1



POT 2



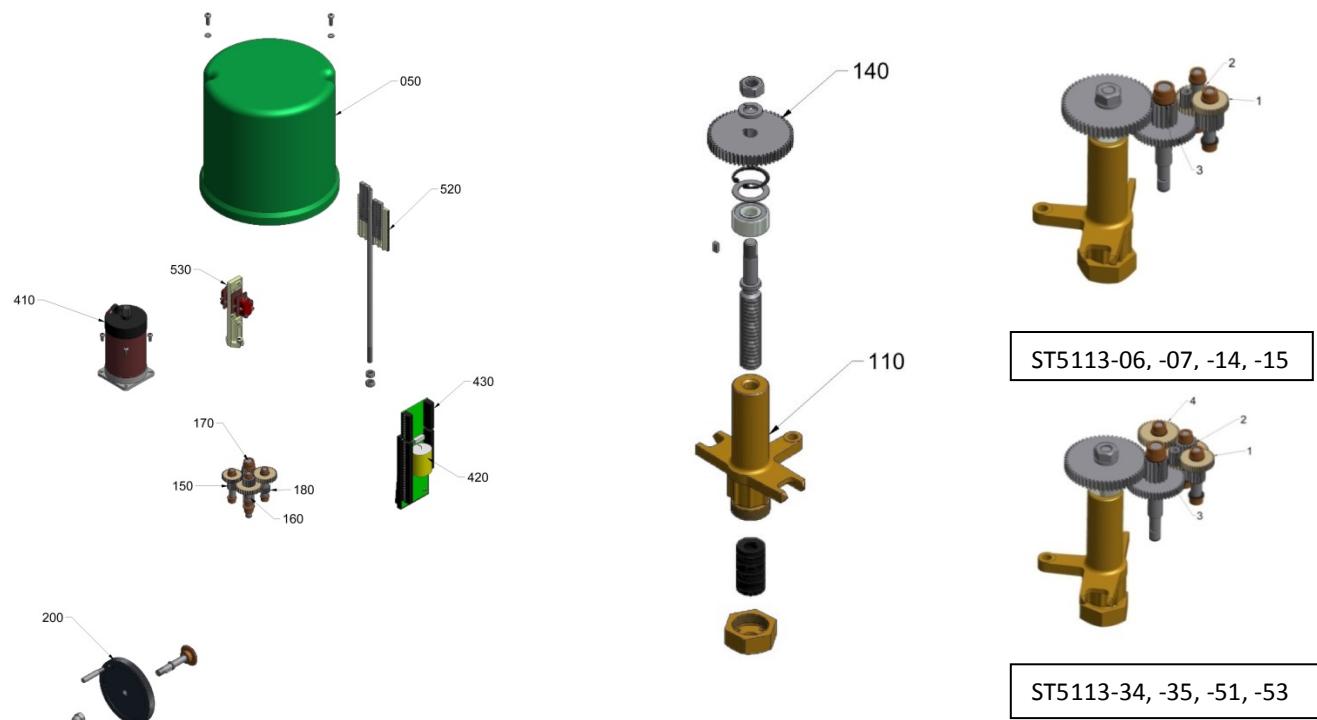
Hz



- E1 limit switch (open position)
- E2 limit switch (closed position)
- E3 limit switch (Intermediate position)
- E4 limit switch (Intermediate position)
- Pot potentiometer
- Hz heating element
- MU452. position transducer
- RE 3447 digital valve positioner
- C capacitor
- B1 Integrated temperature switch

**Table 10 Spare parts list ST5113**

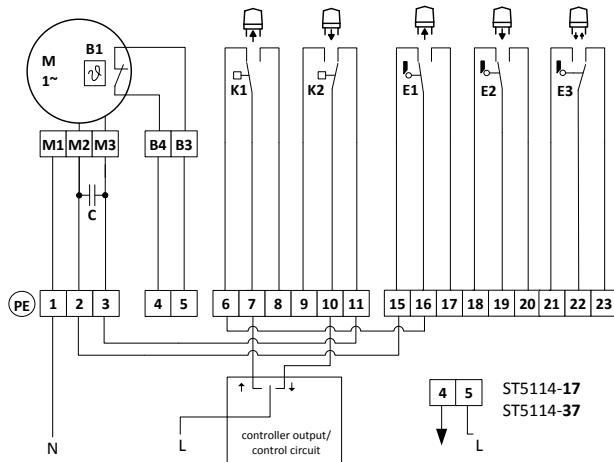
Item	Description	Part no.
050	cover	CADH51130009
110	stem nut group	CSPT13000009
140	gear wheel 0	CZRA51130009
150	gear wheel 1 -06, -07 -14, -15, -34, -35, -51, -53	CZRA51130009 CZRA51131109
160	gear wheel 2 -06, -07 -14, -15 -34, -35 -51, -53	CZRA51132009 CZRA51132109 CZRA51132209 CZRA51132309
170	gear wheel 3	CZRA51133009
180	gear wheel 4 -34, -35 -51, -53	CZRA51134009 CZRA51134109
200	hand wheel	CRAH13000009
410 + 420	motor + capacitor (please state voltage and frequency required)	CMOK -07 CMOK -15, -35 CMOK -51 CMOK -53
410	motor	CMOT -06 CMOT -14, -34
420	capacitor	EKDS -07 EKDS -15, -35 EKDS -51 EKDS -53
430	limit switch PCB	CPLEBB -06, -14, -34 CPLEBB -07 CPLEBB -15, -35 CPLEBB -51 CPLEBB -53
520	cam plate	CSTS13000009
530	limit switch bracket	CTREAA000003



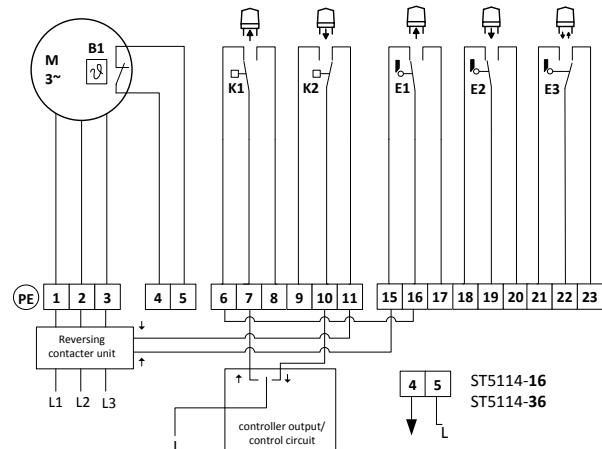
When ordering spare parts please state actuator type and serial number (see data plate). When ordering motors and capacitors please state power supply.

## Standard ST5114 Connection Diagrams

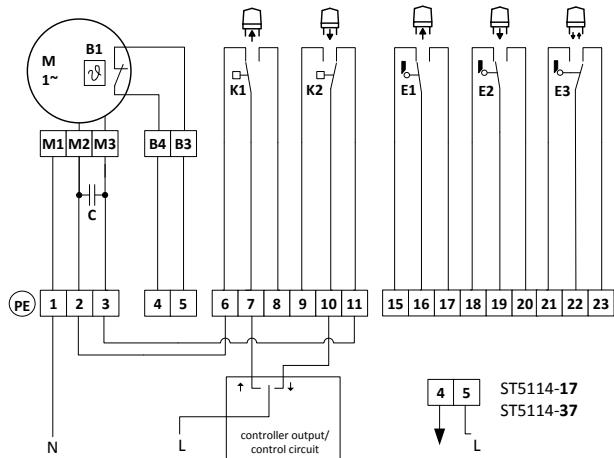
### Single Phase AC (2 Way and Diverting Valve)



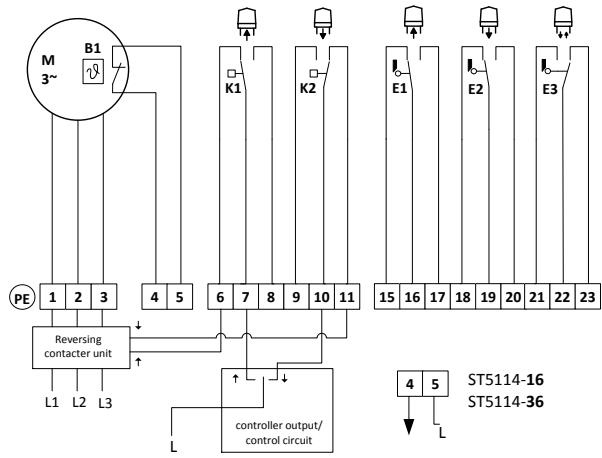
### 3 Phase AC (2 Way and Diverting Valve)



### Single Phase AC (Mixing Valve)

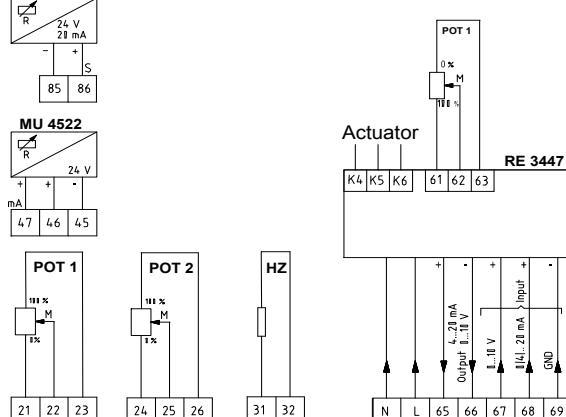
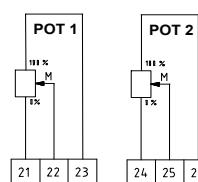
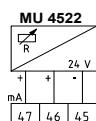
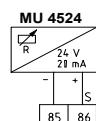


### 3 Phase AC (Mixing Valve)



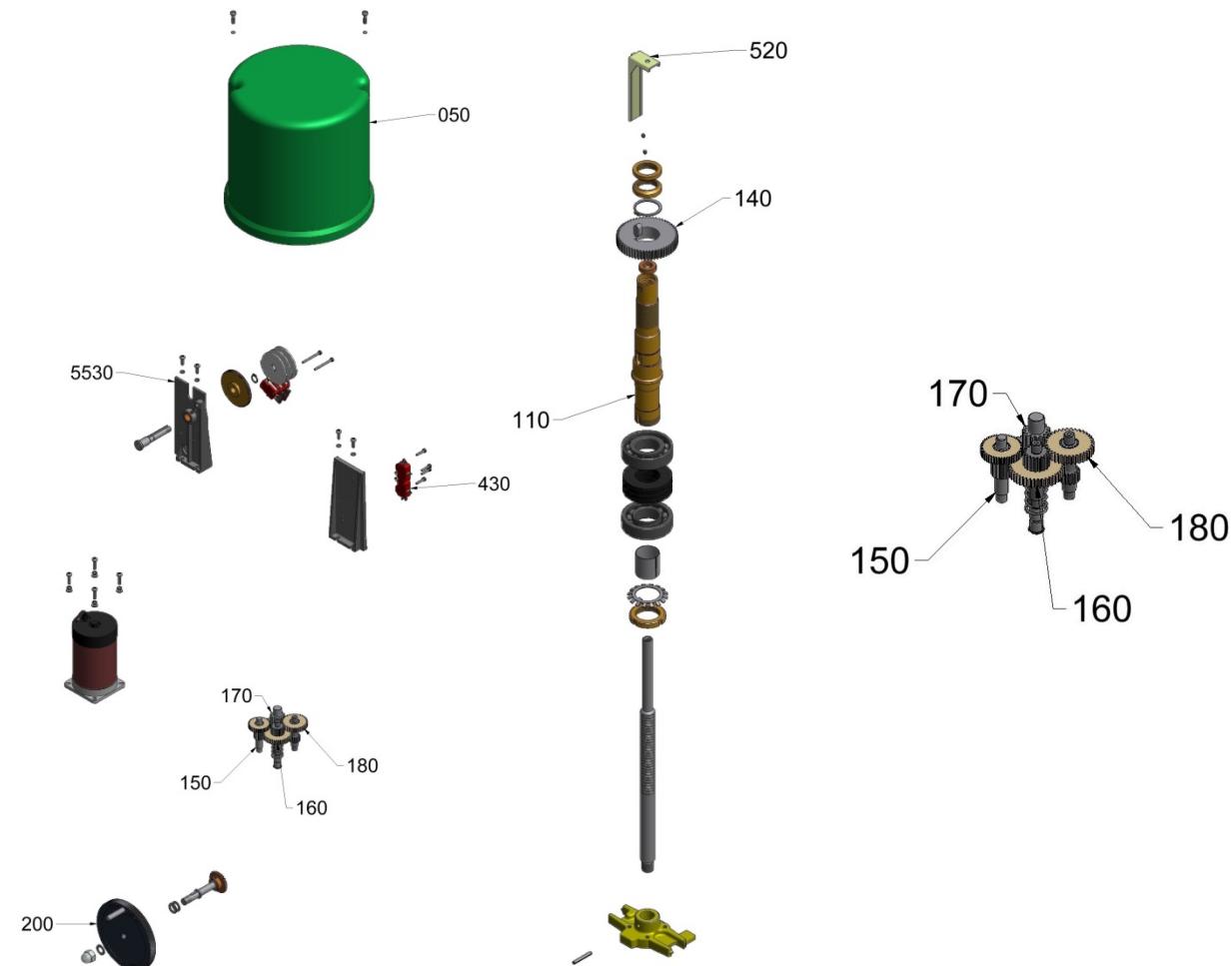
- E1 limit switch (open position)
- E2 limit switch (closed position)
- E3 limit switch (Intermediate position)
- E4 limit switch (Intermediate position)
- Pot potentiometer
- Hz heating element
- MU452. position transducer
- RE 3447 digital valve positioner
- C capacitor
- K1 brake control
- K2 brake control
- B1 Integrated temperature switch

## Accessories



**Table 11 Spare parts list ST5114**

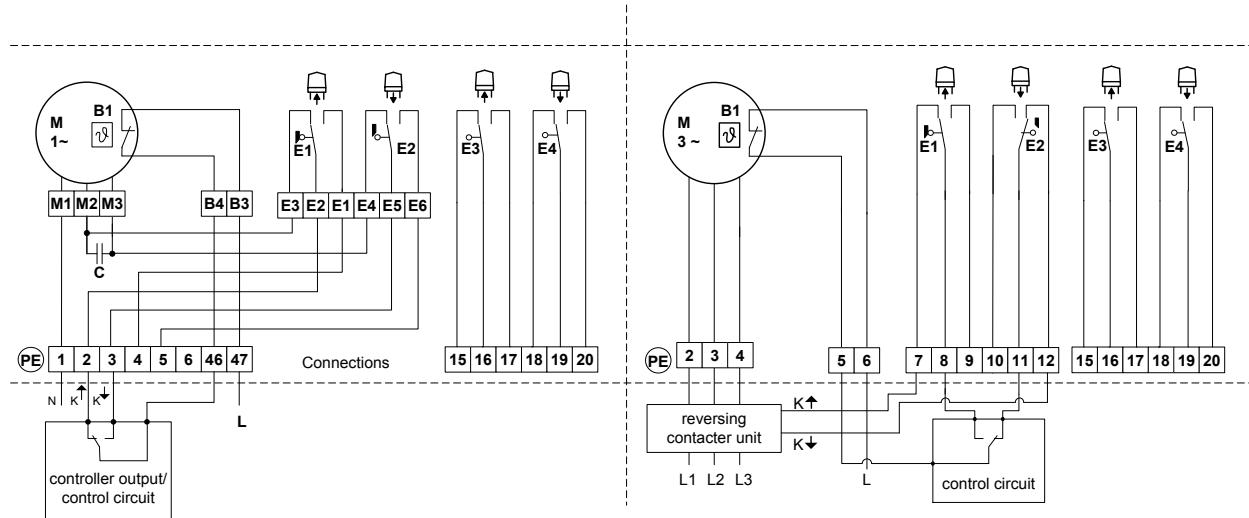
Item	Description	Part no.
050	cover	CADH51130009
110	stem nut group	CSPT14000009
140	gear wheel 0	CZRA51140009
150	gear wheel 1	CZRA51131109
160	gear wheel 2 -16, -17 -36, -37 -54, -55	CZRA51132109 CZRA51132209 CZRA51132309
170	gear wheel 3	CZRA51133009
180	gear wheel 4 -36, -37 -54, -55	CZRA51134009 CZRA51134109
200	hand wheel	CRAH13000009
410 + 420	motor + capacitor (please state voltage and frequency required)	CMOK -17, -37 CMOK -55
410	motor	CMOT -16, -36 CMOT -54
420	capacitor	EKDS -17, -37 EKDS -55
430	limit switch PCB	CPLECB -16, -36, -54 CPLECB -17, -37 CPLECB -55
520	Gear rack group	CSTZ51140009
530	Feedback group	CHRM5114A009



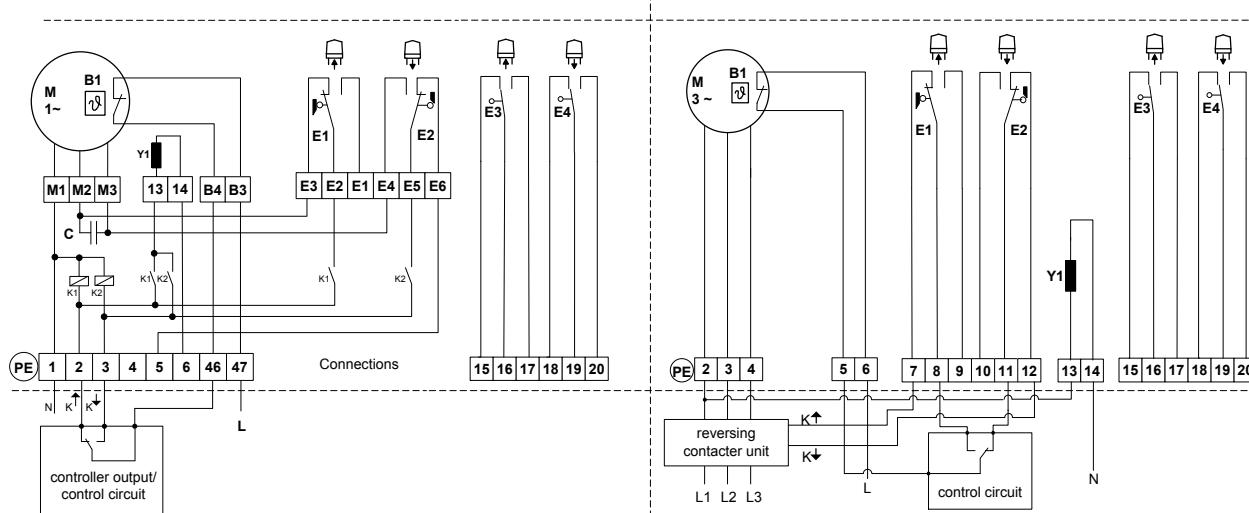
When ordering spare parts please state actuator type and serial number (see data plate). When ordering motors and capacitors please state power supply.

## Standard ST5106 Connection Diagrams

### Single Phase AC

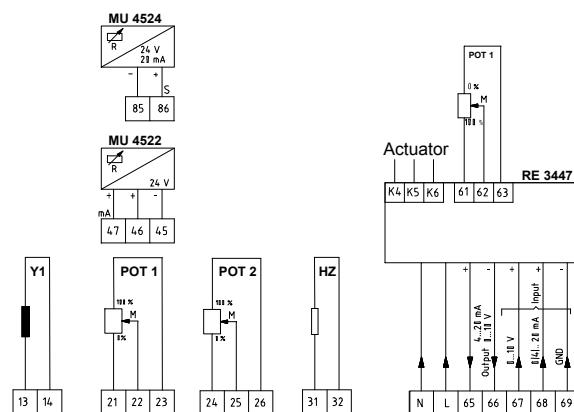


### Single Phase AC (ST5106-61)



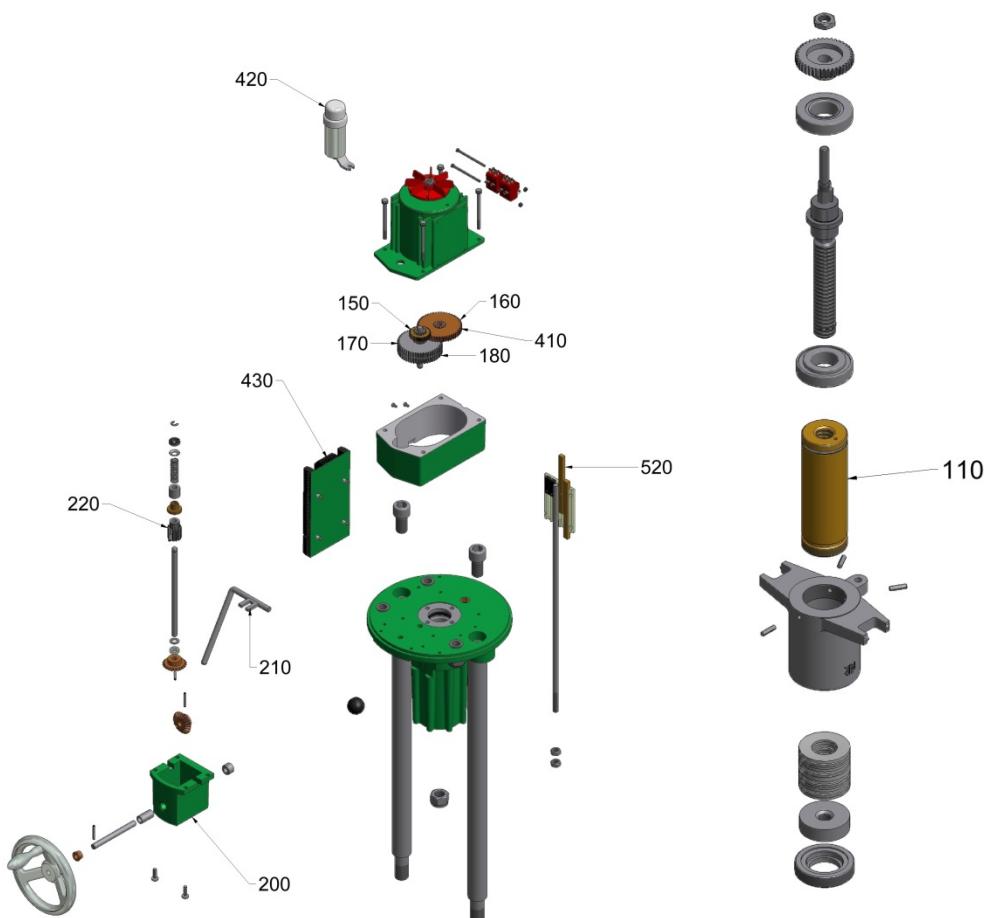
### Accessories

- E1 limit switch (open position)
- E2 limit switch (closed position)
- E3 limit switch (Intermediate position)
- E4 limit switch (Intermediate position)
- Pot potentiometer
- Hz heating element
- MU452. position transducer
- RE 3447 digital valve positioner
- C capacitor
- K1 brake control
- K2 brake control
- B1 Integrated temperature switch  
brake (versions)
- Y1



**Table 12 Spare parts list ST5106**

<b>Item</b>	<b>Description</b>	<b>Part no.</b>
050	cover	CADH51060009
110	stem nut group -20 -60, -61	CSPT0600009 CSPT06000109
140	gear wheel 0	CZRA51060009
150	gear wheel 1	CZRA51061009
160	gear wheel 2	CZRA51062009
170	gear wheel 3	CZRA51063009
180	gear wheel 4	CZRA51064009
200	hand wheel housing	CKSH51060009
210	clutch lever	CHESS51060009
220	Coupling shaft group	CWEK51060009
410	Motor plate group (motor + limit switch PCB) (please state voltage and frequency required)	CMOP06PB0009 CMOP06PB1009 CMOP06PJ0009 CMOP06PJ1009
420	capacitor	EKDS -20, -60 EKDS -61
430	limit switch PCB (230V 50/60Hz) -20, -60 limit switch PCB (230V 50/60Hz) -61	CPLEDB000109 CPLEDB000209
440	motor brake	CBRE51060009
520	cam plate	CSTS06000009



When ordering spare parts please state actuator type and serial number (see data plate). When ordering motors and capacitors please state power supply.

## **10 Troubleshooting**



Only trained and qualified personnel should carry out troubleshooting. Before beginning any work on the valve and/or actuator, ensure it is safe to do so. Make sure that the relevant pipeline is depressurized and the process medium drained, if necessary allow the control valve to cool down or warm up to ambient temperature prior to starting any work. Make sure that the supply air or power supply and control signals are disconnected or blocked to prevent any hazards that could be caused by moving parts.

For troubleshooting of the controlling device and accessories see the instructions furnished by the manufacturer of these items.

For troubleshooting the valve and/or actuator check the following:

Check that the operating conditions have not changed and that the valve is correctly specified. If the operating conditions have changed or the valve is not correctly specified please contact your Authorized Circor Energy Representative

If it is not readily apparent where the fault is, then the valve and actuator need disconnecting (refer to section 7.1) and each item can be checked separately.

### **Troubleshooting valves:**

Open the valve (the bonnet gasket has to be replaced when reassembling the valve) check that there is no foreign material lodged between seat ring and plug, check that there is no foreign material trapped in the plug (perforated plug).

If the seat leakage is too high check that the seat ring and/or plug are not damaged. If they are, then relap them if possible. If this is not possible then they need replacing (refer to section 7.2)

If the valve plug doesn't move and there is no foreign material inside the valve then contact your Authorized Circor Energy Representative.

Retightening or replacing a damaged or leaking stem packing

Graphite stem packing can be retightened

PTFE-Graphite stem packing has to be replaced (see section 7.3)

### **Troubleshooting pneumatic actuators:**

Check that the correct air supply is present (max. 87 PSI [6 bar]) and check that the air supply is clean dry instrument air with no moisture, oil or dust. Check that the air supply is connected to the correct port on the actuator. Check that the correct input signal is present (if required). If a positioner is installed, please check the IOM from the manufacturer.

Check that the actuator doesn't leak and that the diaphragm is not damaged. To replace a damaged diaphragm refer to section 8.2.

If there is a solenoid valve check that the correct supply voltage is present and that the solenoid valve has been correctly installed (piping).

## **Troubleshooting electric actuators:**

Check that actuator can be moved manually (using the handwheel). If not, then there is a mechanical problem, if yes then there is an electrical problem.

### Mechanical

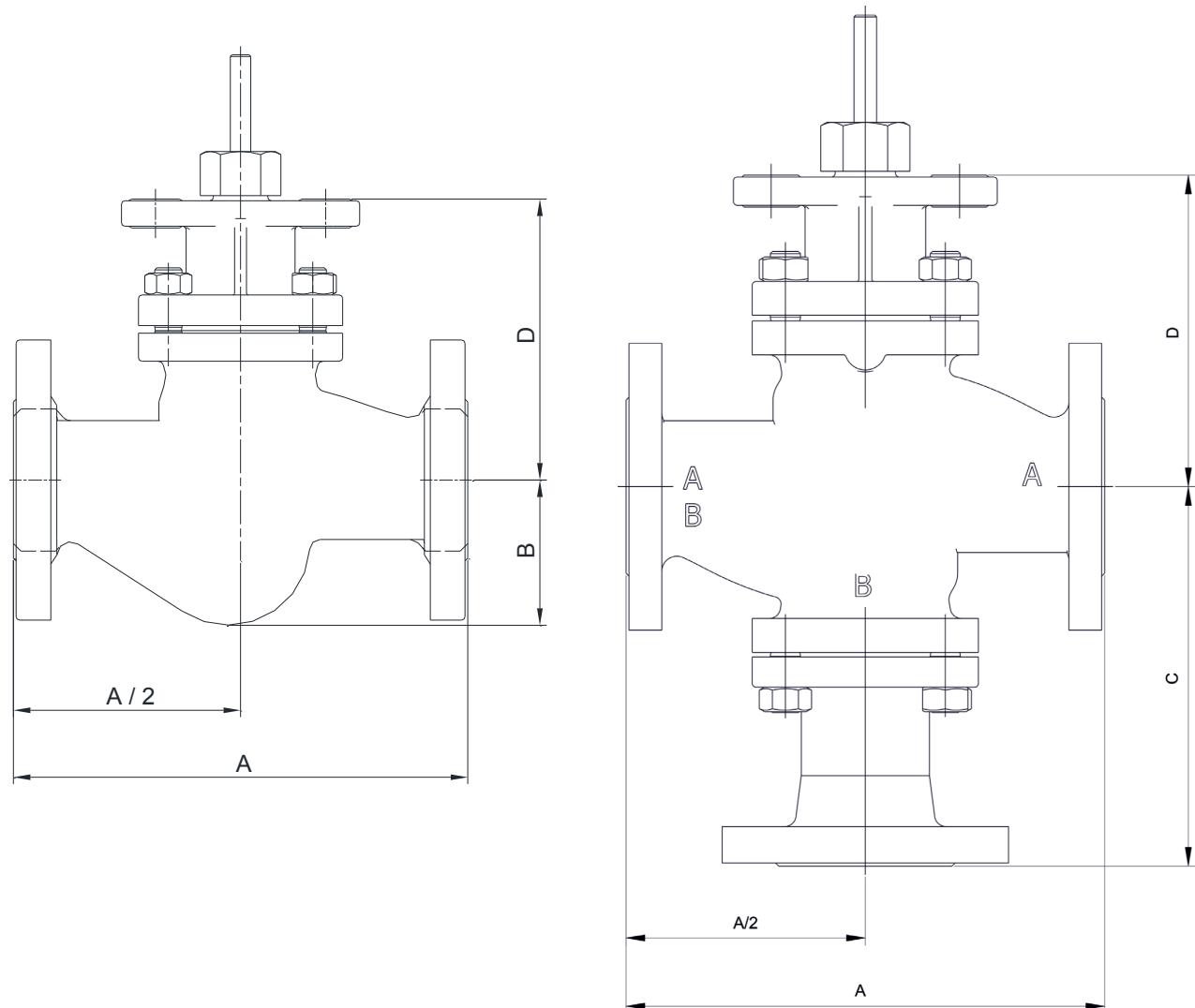
Remove the cover over the gear wheels and check these for obvious signs of damage (missing teeth etc) replace any damaged gear wheels. If the gear wheels are not damaged then the stem nut needs replacing

### Electrical

Check that the correct supply voltage and control signal (if required) are present. Check that the limit switches have been correctly adjusted, if not re-adjust them (see document 3447-8010). Check that the motor rotates and that it rotates freely, if not it needs replacing. Check that the internal wiring is correct (see standard wiring diagrams in section 9, or wiring diagrams in document 3447-8010). If unresolved, contact your Authorized Circor Energy Representative

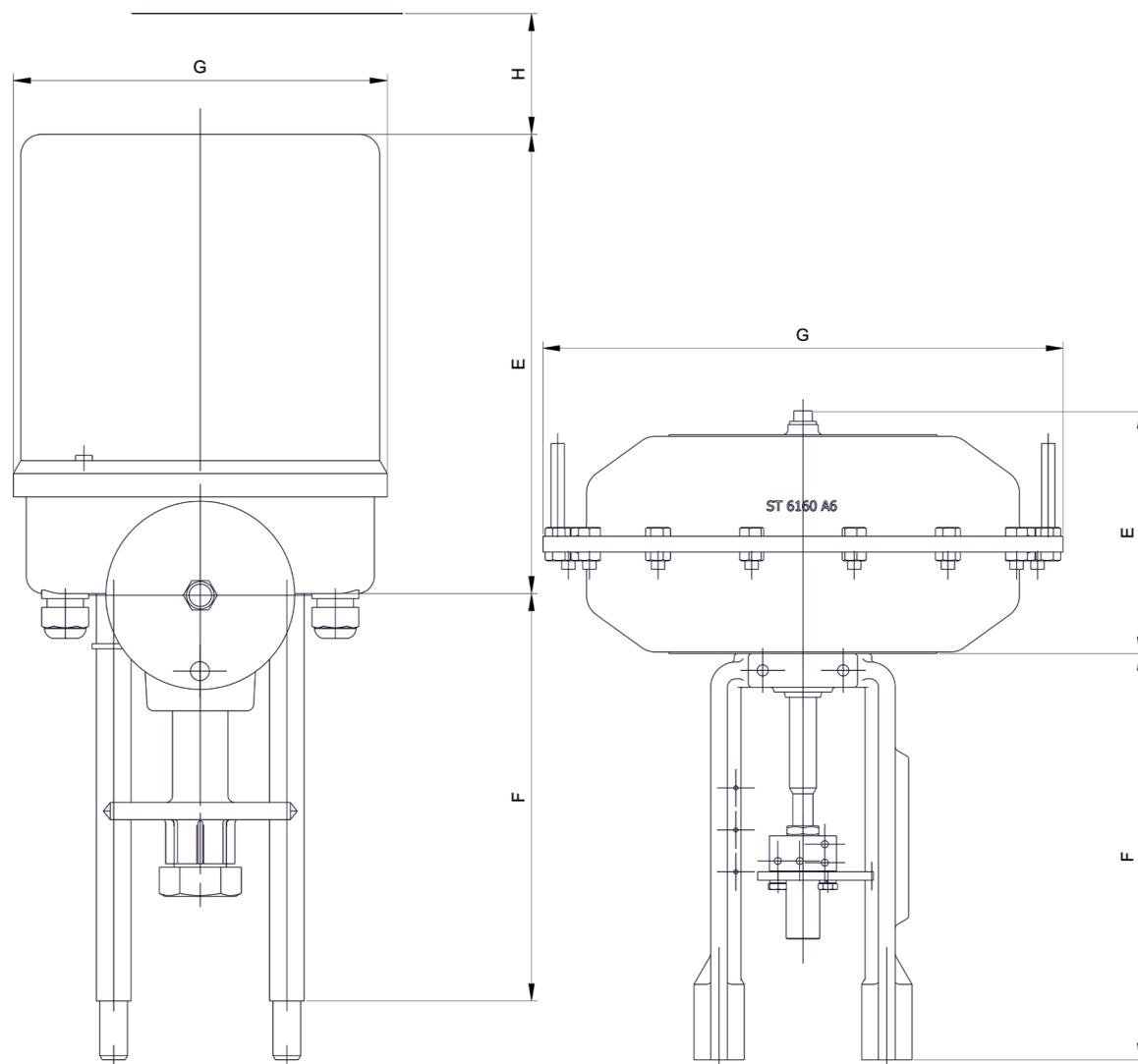
If there is a digital valve positioner and the red error LED is lit then refer to document 3447-8010.

## 11. REflex Dimensions and Weights





### REFLEX DIMENSIONS AND WEIGHTS (continued)



Actuator	E	F	G	H	Weight
Electric					
React	8 (200)	7 1/8 (180)	Actuator + ECU	7 3/8 (186)	5 1/8 (130) 9 (4.2)
ST5112	8 1/8 (206)	7 1/8 (180)	15 3/8 (390)	7 1/2 (191)	5 1/8 (130) 11 (5)
ST5113	10 1/8 (265)	9 1/8 (238)	16 1/8 (410)	8 1/2 (216)	7 1/8 (200) 22 (10)
ST5114	10 1/8 (265)	10 (255)	16 1/8 (435)	8 1/2 (216)	7 1/8 (200) 22,5 (10.3)
ST5106	8 1/8 (225)	16 1/8 (430)	29 1/2 (750)	8 1/8 (205)	7 1/8 (200) 48,5 (22)
Pneumatic					
ST6135.B6	5 1/8 (136)	8 1/4 (211)		8 1/4 (210)	16.5 (7.5)
ST6160.A6	6 1/2 (166)	8 1/4 (211)		12 1/4 (310)	33 (15)
ST6160.C6	7 1/8 (186)	9 1/8 (231)		12 1/4 (310)	36.5 (16.5)
ST6175.B6	9 1/4 (234)	11 1/4 (285)		16 1/8 (430)	105.5 (48)
ST6175.C6	14 1/8 (374)	12 1/8 (320)		16 1/8 (430)	147.5 (67)

For actuators with standard pillars/yokes (Pillars and yokes same length)

Dimensions in Inches (mm) Weight in Lbs. (Kg)

For length of pillars with bellows seal please contact factory or Authorised Circor Energy Representative

