
Operating instructions and spare parts list

SR02 Swivel axis

TW
Gema



Documentation SR02 Swivel axis

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General safety regulations

This chapter specifies the fundamental safety regulations that must be followed by the user and third parties using the SR02 Swivel axis.

These safety regulations must be read and understood before the SR02 Swivel axis is used.

Safety symbols (pictograms)

The following warnings with their meanings can be found in the ITW Gema operating instructions. The general safety precautions must also be followed as well as the regulations in the operating instructions.

**DANGER!**

Danger due to live electricity or moving parts. Possible consequences: Death or serious injury

**WARNING!**

Improper use of the equipment could damage the machine or cause it to malfunction. Possible consequences: minor injuries or damage to equipment

**INFORMATION!**

Useful tips and other information

Product specific security measures

- It must be noted that the reciprocators, gun holders etc. installed on the SR02 Swivel axis can strongly swerve at the upper end!
- All moving axes must be secured by security gates before start-up and during operation (see the local regulations)!
- The SR02 Swivel axis may only be switched on and operated after careful reading of this manual. Incorrect operating of the SR02 Swivel axis and the corresponding control unit can lead to damage to the axis or other parts
- The plug connection between the SR02 Swivel axis and the control unit should only be connected when the control unit is switched off

- The connecting cable between the SR02 Swivel axis and the control unit must be laid in such a way, that it cannot be damaged during axes operation. The movement sequence of the Z- and X-/Y axes must be observed too
- The swiveling angle must be adapted to the other components of the plant such as reciprocator, gun holder, booth slots etc. If the swiveling angle is set incorrectly, this can lead to damage to the SR02 Swivel axis or other plant units!
- When repairing the SR02 Swivel axis, the control unit and the power pack must be disconnected from the mains according to the local safety regulations!
- Only original ITW Gema spare parts may be used! The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!
- It must be noted, that the SR02 Swivel axis has to be grounded before start-up!
- Repairs may only be done by personnel correspondingly trained by ITW Gema

Conformity of use

The SR02 Swivel axis is only intended for the defined application range. The use outside of this range is considered as not intended use.



Note:
For further information, see the more detailed ITW Gema safety regulations!

About this manual

General information

This operating manual contains all the important information which you require for the working with the SR02 Swivel axis. It will safely guide you through the start-up process and give you references and tips for the optimal use of your new powder coating system.

Information about the function mode of the individual system components - reciprocators, booths, powder gun control units, powder guns etc. - should be referenced to their corresponding documents.

Function description

Field of application

The SR02 Swivel axis is designed exclusively to carry and to move the ITW Gema reciprocators (ZA and YT).

Any other use is considered as non-conform. The manufacturer is not responsible for any damage resulting from this - the risk for this is assumed by the user alone!

SR02 Swivel axis - function

Typical characteristics

In many coating plants, particularly cubic objects are suspended diagonally to the gun movement. In this way, after the cleaning of the objects, the cleaning fluid can drain off entirely and the objects can arrive dry in the coating booth.

If the guns now move vertically, the spraying distance from the gun to the object changes, and thereby also the coating layer thickness on the object changes.

The SR02 Swivel axis enables to incline the reciprocator up to 10°, and therefore to keep the spraying distance evenly. If the reciprocator inclines in direction to the booth, this is called a negative swiveling angle. If the reciprocator inclines in direction away from the booth, this is called a positive swiveling angle.

The SR02 Swivel axis allows to incline the reciprocator to a defined position. In order to keep the swivel axis as stable as possible, the swiveling movement is limited by the power consumption of the motor. If the swivel axis travels to the mechanical stops, the power consumption of the motor increases, the motor will be switched off, and the brake will be activated. In this way, the swivel axis is fixed in the end positions and is therefore stable. Therefore, the reciprocator may not be put into operation in the intermediate positions.

It must always be noted, that the operating space of the SR02 Swivel axis and the installed reciprocator, respectively the gun holder, must be secured according to the local regulations!

Before the SR02 Swivel axis is put into operation, the end stop of the swivel position must be adjusted firmly!

Technical data

SR02 Swivel axis

Technical information

SR02 Swivel axis	
Max. load	1 ACR Reciprocator, ZA or YT
Swiveling time	approx. 20 secs.
Swiveling angle	0-10°, manually adjustable

Electrical data

SR02 Swivel axis	
Drive unit	AC motor, 3x400 VAC
Performance	0,12 kW
Frequency	50/60 Hz
Reference point	none
Monitoring of the end stop	Proximity switch
Protection type	IP54



Attention:

Due to accident risk and depending on the placement of the reciprocator, the safety barriers have to be placed in accordance to the local regulations!

Assembly and set-up

Assembly



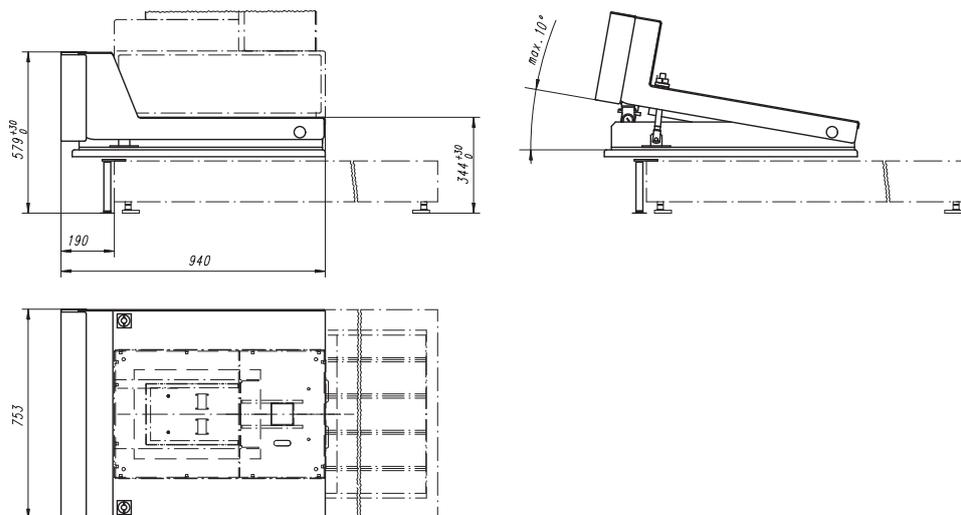
Attention:

During the assembly work, the connection cable between the drive unit and the control unit may not be connected! All assembly works must be checked by trained personnel!

By assembling the SR02 Swivel axis, the following points are to be observed:

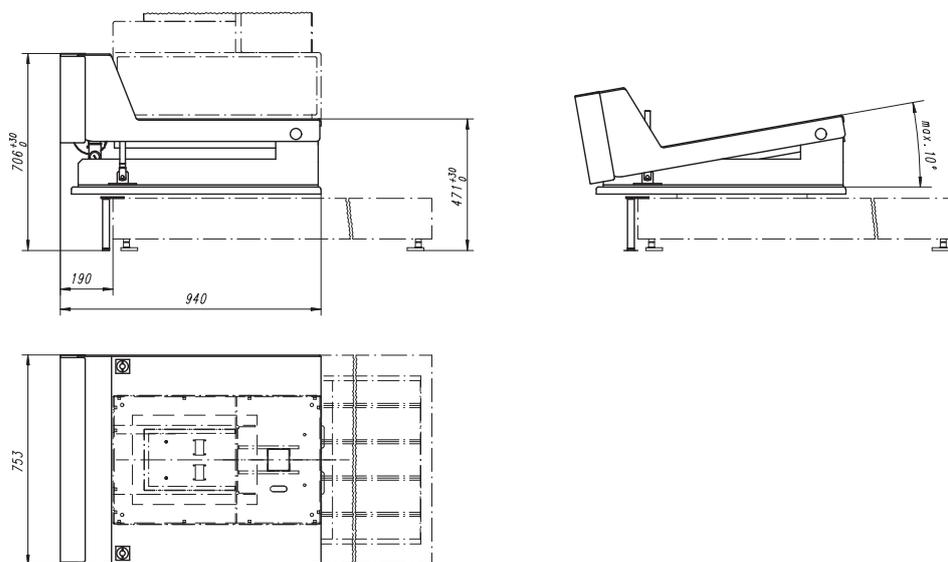
- The drive unit of the swivel axis is equipped with a brake and can not be moved when disconnected from mains
- The swivel axis must be firmly installed on the carriage of the horizontal axis, before assembling the reciprocator
- The reciprocator must be installed in horizontal position of the swivel axis
- Before the swivel axis will be moved, the frame of the horizontal axis must be fixed on the floor with the supplied parts. This fixation must take place on the opposite side of the pivotal point!

SR02 Swivel axis - negative



SR02 Swivel axis - negative

SR02 Swivel axis - positive



SR02 Swivel axis - positive

Set-up



Attention:

By setting the swiveling angle, it must be noted that the guns or the reciprocator may not touch the booth or the gun slots etc. and damage can occur!

The swiveling angle must be manually defined by the mechanical stops. This must take place according to the following instructions:

- Check the control unit parameters, respectively the frequency converter
- Adjust approximately the end point and fasten it
- Move the swivel axis into position with the control unit
- Check the parallelism between the gun movement and the coating object - if deviations occur, move back the swivel axis to the basic position and readjust the end stop
- This process has to be repeated until the coating distance remains even for the entire stroke length!

Start-up

SR02 Swivel axis - preparation for start-up

**Attention:**

The connection cable between the drive unit and the control unit may only be connected during start-up! The start-up must take place by trained personnel only!

Before start-up, the following points must be checked:

- All screw connections have to be firmly tightened
- Check the cable and hose layout, so that no damages can occur during the entire swivel range and travel distance
- Check the cable and hose layout also with other movement sequences, so that no damages can occur
- Lock up the swiveling area according to the local safety regulations, so that no persons are at risk
- Check the parameters in the control unit
- Check, if swiveling by control unit can be released only in positions, in which no damage can occur

Start-up



Attention:

Since the current actual position of the swivel axis is not stored at a plant stop, respectively operation break, it must be assumed that the swivel axis can start a swiveling movement by switching on the equipment! Therefore, the required swiveling range must always be checked first!

The intended standard switch-on procedure for coating stations with swivel axis is the following:

- The reciprocator travels to the reference point and stops
- The swivel axis travels to the vertical position of the reciprocator and stops
- The horizontal axis travels to the reference point and stops
- The coating station is totally in reference position and therefore ready for switching on the equipment

Before starting up the equipment, the following points must be observed:

- Check, if the starting procedure can take place without putting persons at risk
- Check, if the starting procedure can take place without damage to the coating objects
- Check after a conveyor stop, if there are any objects in the booth
- Check, if the guns move in direction to the coating object when the swiveling angle is negative
- Check, if the starting procedure can take place without damage to the powder guns, respectively the booth
- Check when the swiveling angle is positive, if the guns travel closer to the booth floor or the lower edge of the gun slot, when a reference travel of the reciprocator takes place

Setting values/parameters



Attention:

The setting and the modification of parameters must be done only by trained personnel! Incorrect settings can cause damages to the control unit, the swivel axis or the coating equipment!

Altivar 58 frequency converter

The SR02 Swivel axis is equipped with a Altivar 58 frequency converter. The frequency converter must have adjusted the following system parameters:

Adjusted parameters

Menu "Operation"	Code	Value
	SUP	

Menu "Setting"	Code	Value
	SET	
Starting time	ACC	5.0
Slow-down time	dEC	3.0
Small frequency	LSP	50.0
Large frequency	HSP	50.0
Amplification	FLG	20.0
Attenuation	StA	20.0
I thermal	ItH	1.1
I DC-brake	tdC	0.5
IR-compensation	Ufr	100
Slip compensation	SLP	100
Preselection frequency 2	SP2	50.0
Preselection frequency 3	SP3	50.0
I-threshold	Cdt	1.1
F fade-out	JPF	0.0
T small Fr-s	tLS	0.0
Coefficient Masch	USC	1.0

Menu "Drive unit"	Code	Value
3 drive unit		
Ue motor	UnS	230
F nominal motor	Frs	50.0
Ie motor	nCr	1.1
Nominal rpm	nSP	1400
cos Phi motor	COS	0.7
Motor measuring	tUn	NO
max. frequency	tFr	60
Anp. slow-down time	brA	0.0
F ramp 2	Frt	0.0
Ramp type	rPt	LINEAR
Moment limit. 1	tLI	200
Limit. current	CLI	1.5
Auto GS-Br.	AdC	YES
Type F-pulse	SFt	LOW
Pulse frequency	SFr	4

Menu "Drive unit"	Code	Value
Low-noise	nrd	YES
Special motor	SPC	NO

Menu "Control unit"	Code	Value
2/3 wire	tCC	2-value
Type 2-wire	tCt	EL: LEVEL
only pos. Sum.	RIn	NO
	BSP	NO
min. value AI2	CrL	4
max. value AI2	CrH	20
Local control unit	LCC	NO
Priority stop	PSt	XES
Converter address	Add	0

Menu "E/A allocation"	Code	Value
Allocation LI2	LI2	RV: ANTI CLOCK-WISE
Allocation LI3	LI3	PS3: FIXEDFREQ.
Allocation LI4	LI4	PS4: FIXEDFREQ.
Allocation AI2	AI2	SAI: SàUM.preset value
Allocation R2	r2	CTA: I-THRESHOLD

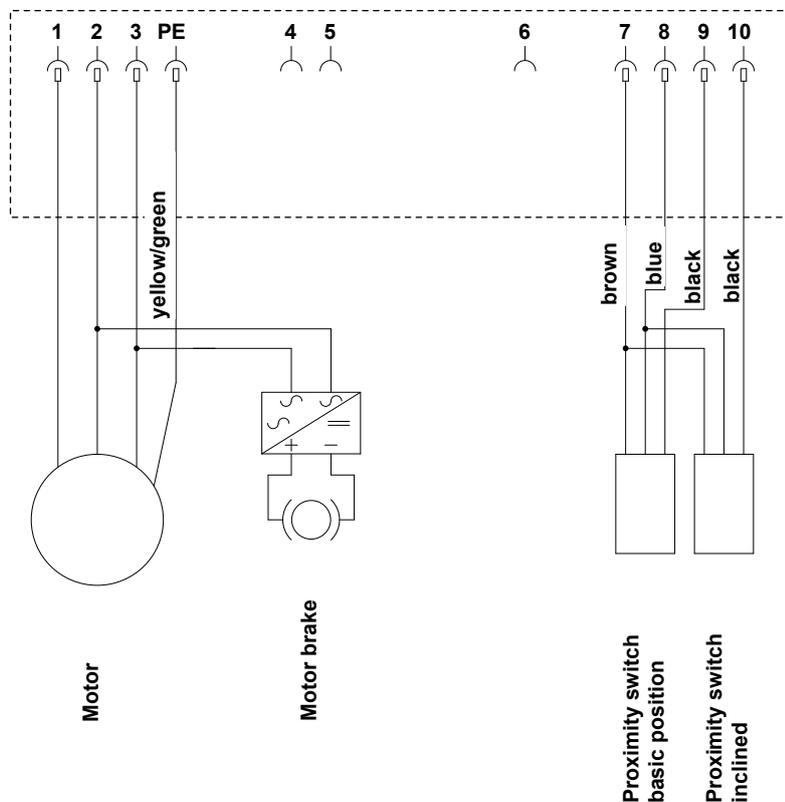
Menu "Troubleshooting"	Code	Value

Menu "Conf-file"	Code	Wert

Menu "Application/ Communication"	Code	Wert

Plug assignment of cable connections

Swivel axis cable connection



Function	Contact	Color
Motor	1	black
Motor	2	brown
Motor	3	blue
	4	
Brake	5	
Brake	6	
Proximity switch, basic position Proximity switch, pivoted	7	brown brown
Proximity switch, basic position Proximity switch, pivoted	8	blue blue
Proximity switch, basic position	9	black
Proximity switch, pivoted	10	black
	11	
	12	
	13	
	14	
	15	
	16	
Motor	Ground	yellow/green

Maintenance

SR02 Swivel axis - maintenance works



Attention:

Before maintenance works take place, always be sure that nobody can switch on the moving axes!

The SR02 Swivel axis is built in solid manner and does not require many maintenance works. However, the following works should be carried out regularly:

- Remove the powder accumulations from the swivel axis
- All screw connections have to be firmly tightened
- Check the fixation of the horizontal axis on the floor
- Check the cable and hose connections if they are firmly fitted and for wear

Troubleshooting

SR02 Swivel axis


Attention:

During troubleshooting and remedy, always be sure that nobody can switch on the moving axes!

Fault	Causes	Troubleshooting
Axes cannot be put into operation	The proximity switches for controlling the end stops emit no signal	Check the proximity switch LED Check the switching distance Check the cable connection
Reciprocator do not stand parallel to gun slots when inclined	End stops are not correctly installed	Install the end stops correctly
Reciprocator do not stand not firmly	Swivel axis is not in end position	Move the swivel axis to the end position
	Swivel axis does not move to the end position	Check the parameters of the frequency converter
	Current consumption of motor is too large	Check the gearbox, check the swivel bearing

Spare parts list

Ordering spare parts

When ordering spare parts for powder coating equipment, please indicate the following specifications:

- Type and serial number of your powder coating equipment
- Order number, quantity and description of each spare part

Example:

- **Type** SR02 Swivel axis
Serial number 1234 5678
- **Order no.** 203 386, 1 piece, Clamp - Ø 18/15 mm

When ordering cable or hose material, the required length must also be given. The spare part numbers of this yard/meter ware is always marked with an *.

The wear parts are always marked with a #.

All dimensions of plastic hoses are specified with the external and internal diameter:

Example:

Ø 8/6 mm, 8 mm outside diameter (o/d) / 6 mm inside diameter (i/d)



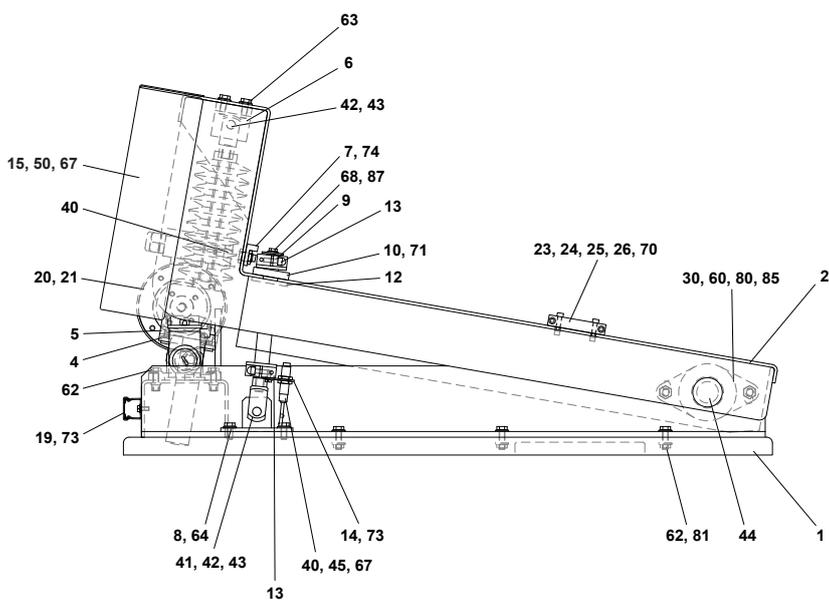
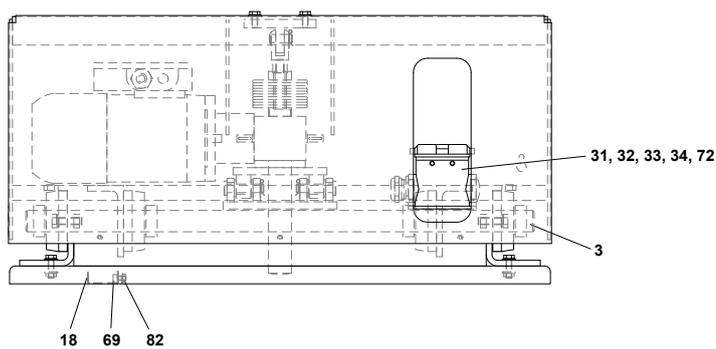
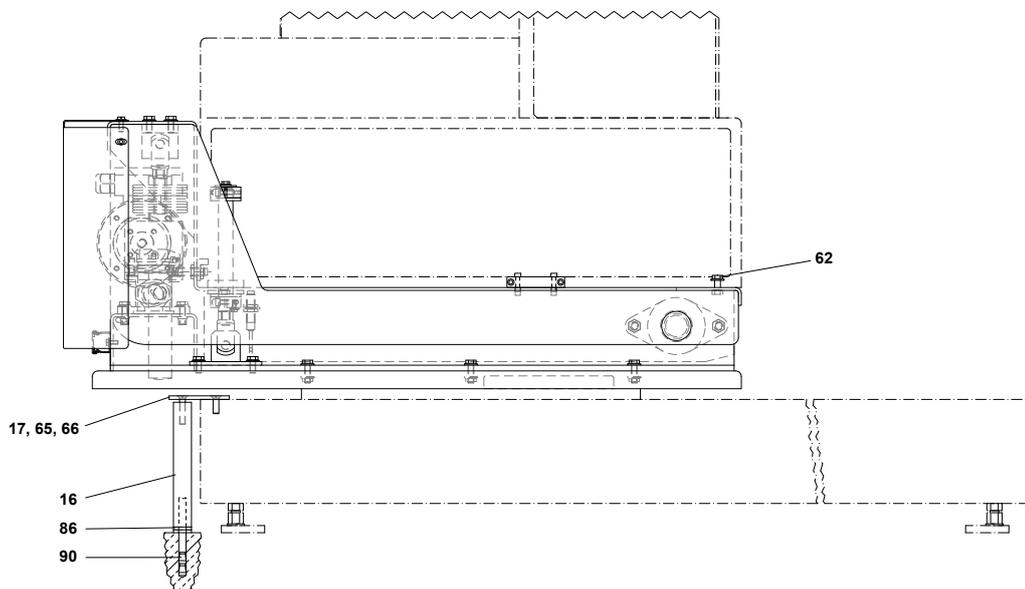
WARNING!

Only original ITW Gema spare parts should be used, because the hazardous location approval will be preserved that way! The use of spare parts from other manufacturers will invalidate the ITW Gema guarantee conditions!

SR02 Swivel axis, negative - spare parts list

1	Carriage plate	388 238
2	Swivel plate	388 220
3	Axis	376 566
4	Gearbox plate - complete	382 647
5	Spacer plate	376 590
6	Gearbox holder	376 612
7	Collision protection	376 620
8	Clevis holder	376 639
9	End stop column	385 786
10	Clamping plate	376 671
12	Thread plate	376 663
13	End stop - complete	379 670
14	Limit switch holder	376 698
15	Cover	376 710
16	Spacer	376 736
17	Bracket (stop rod)	376 728
18	Horizontal axis cable duct	372 480
19	Cable duct - 25/20/588 mm	376 540
20	Drive unit - complete	378 500
21	Swivel axis motor cable	379 590
23	Clamping profile SS	386 820
24	Clamping profile GS	386 839
25	Cable bush	386 847
26	Gasket	386 855
30	Flange bearing - Ø 30 mm	261 041
31	Socket case - 10 pins	251 569
32	Plug insert - 10 pins	211 540
33	Lead-through - PG21/3	235 318
34	Plug screw - PG21	256 587
40	Proximity switch	246 760
41	Clevis - M12x24 mm	261 050
42	Bolt - Ø 12x29x24 mm	261 009
43	Spring clip - A-12	261 017
44	Blind grommet - TI-4-388	200 891
45	Hose clamp	252 662
50	Edge protection profile	100 552

SR02 Swivel axis, negative - spare parts



SR02 Swivel axis, negative - spare parts

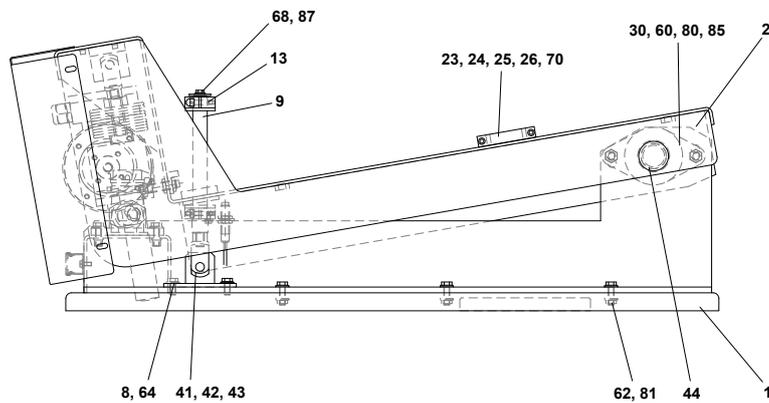
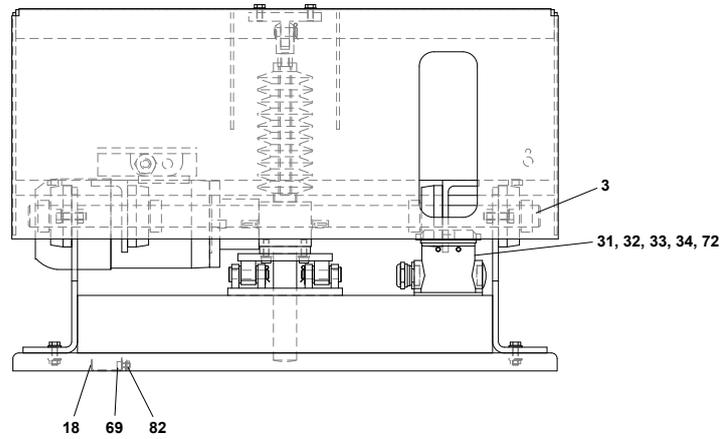
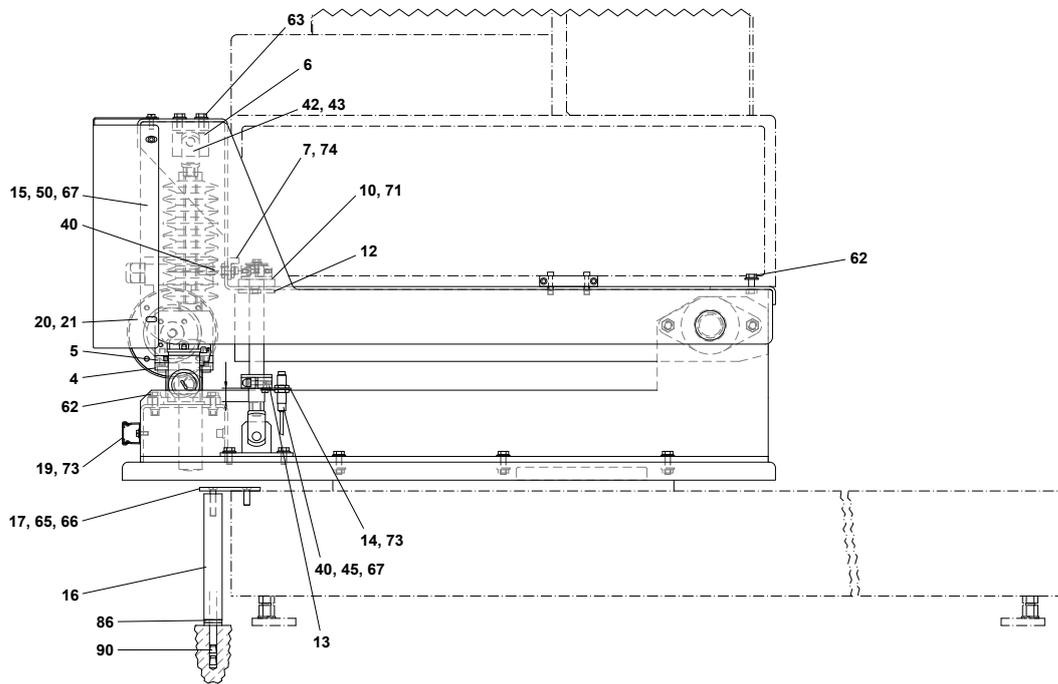
SR02 Swivel axis, negative - spare parts list (cont.)

60	Hexagon screw - M10x35 mm	214 132
62	Hexagon shakeproof screw - M8x25 mm	244 465
63	Hexagon shakeproof screw - M8x20 mm	244 422
64	Hexagon shakeproof screw - M8x16 mm	244 457
65	Hexagon screw - M8x40 mm	244 228
66	Countersunk-head screw - M8x25 mm	261 068
67	Cap screw - M6x16 mm	243 833
68	Hexagon shakeproof screw - M6x12 mm	244 406
69	Allen cylinder screw - M6x12 mm	216 402
70	Allen cylinder screw - M5x30 mm	216 372
71	Allen cylinder screw - M5x16 mm	216 356
72	Cap screw - M5x16 mm	216 852
73	Cap screw - M5x12 mm	239 941
74	Allen grub screw - M5x16 mm	237 744
80	Hexagon nut - M10	215 589
81	Hexagon shakeproof nut - M6	244 430
82	Hexagon shakeproof nut - M6	244 430
85	Ribbed washer - M10	237 981
86	Washer - Ø 10.5/25x4 mm	202 924
90	Steel bolt dowel - M10x90 mm	245 216
97	Washer - Ø 7/30x2 mm	243 922

SR02 Swivel axis, positive - spare parts list

1	Carriage plate	388 246
2	Swivel plate	388 220
3	Axis	376 566
4	Gearbox plate - complete	382 647
5	Spacer plate	376 590
6	Gearbox holder	376 612
7	Collision protection	376 620
8	Clevis holder	376 639
9	End stop column	376 647
10	Clamping plate	376 671
12	Thread plate	376 663
13	End stop - complete	379 670
14	Limit switch holder	376 698
15	Cover	376 710
16	Spacer	376 736
17	Bracket (stop rod)	376 728
18	Horizontal axis cable duct	372 480
19	Cable duct - 25/20/588 mm	376 540
20	Drive unit - complete	378 500
21	Swivel axis motor cable	379 590
23	Clamping profile SS	386 820
24	Clamping profile GS	386 839
25	Cable bush	386 847
26	Gasket	386 855
30	Flange bearing - Ø 30 mm	261 041
31	Socket case - 10 pins	251 569
32	Plug insert - 10 pins	211 540
33	Lead-through - PG21/3	235 318
34	Plug screw - PG21	256 587
40	Proximity switch	246 760
41	Clevis - M12x24 mm	261 050
42	Bolt - Ø 12x29x24 mm	261 009
43	Spring clip - A-12	261 017
44	Blind grommet - TI-4-388	200 891
45	Hose clamp	252 662
50	Edge protection profile	100 552

SR02 Swivel axis, positive - spare parts



SR02 Swivel axis, positive - spare parts

SR02 Swivel axis, positive - spare parts list (cont.)

60	Hexagon screw - M10x35 mm	214 132
62	Hexagon shakeproof screw - M8x25 mm	244 465
63	Hexagon shakeproof screw - M8x20 mm	244 422
64	Hexagon shakeproof screw - M8x16 mm	244 457
65	Hexagon screw - M8x40 mm	244 228
66	Countersunk-head screw - M8x25 mm	261 068
67	Cap screw - M6x16 mm	243 833
68	Hexagon shakeproof screw - M6x12 mm	244 406
69	Allen cylinder screw - M6x12 mm	216 402
70	Allen cylinder screw - M5x30 mm	216 372
71	Allen cylinder screw - M5x16 mm	216 356
72	Cap screw - M5x16 mm	216 852
73	Cap screw - M5x12 mm	239 941
74	Allen grub screw - M5x16 mm	237 744
80	Hexagon nut - M10	215 589
81	Hexagon shakeproof nut - M8	244 449
82	Hexagon shakeproof nut - M6	244 430
85	Ribbed washer - M10	237 981
86	Washer - Ø 10.5/25x4 mm	202 924
87	Washer - Ø 7/30x2 mm	243 922
90	Steel bolt dowel - M10x90 mm	245 216