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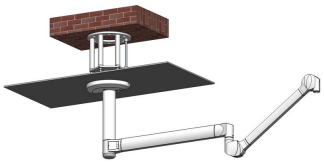
ID No: 47306581 VAT ID No: CZ 47306581 E-mail.: export@mzliberec.cz
**The producer is a holder of EN ISO 9001:2008 and EN ISO 13485:2003 Quality Control Certificates**



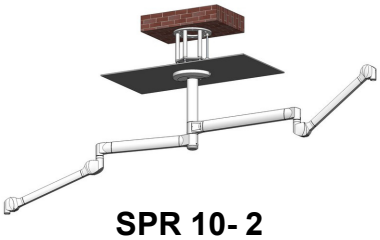
# INSTALLATION GUIDE

for power holders of medical device

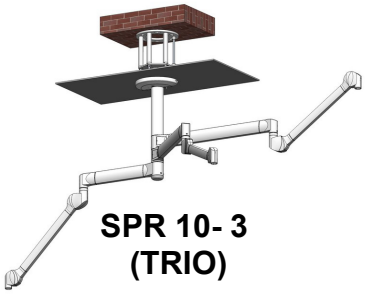
# CEILING PENDANTS WITH COMPACT SPRING BALANCED SWIVEL AND ROTARY ARMS



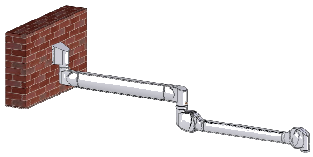
**SPR 10- 1**
**(SINGLE)**



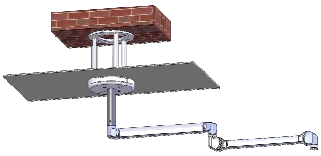
**SPR 10- 2**
**(DUO)**



**SPR 10- 3**
**(TRIO)**



**SPR 10- 1W**
**(SINGLE - W)**



**SPR 11**
**(UNO)**

Date of approval
of last revision: 30.08.2012

# INDEX:



There are some paragraphs in the User´s Guide marked with these labels, to have to be carefull about::

WARNING

CAUTION

DANGER

# BASIC INFORMATION

**INDICATION OF PRODUCTS, PURPOSE OF USING**
**The pendants with rotary and compact spring balanced swivel arms produced in types SPR 10-1,2,3 and SPR 11-1,2** – medical device Class 1
**(herinafter referred as SPR) are medical devices** (surgical luminaires, cameras, monitors, X-ray apparatus
safety screen etc.) **holders containing electric installations, and are intended for medical facilities equipment, for usage in ways and configurations determinated by the respectively trained health workers**
**according to their needs.** When manipulating and maintaining the pendants, the safety instructions of using

electric devices and conditions stated in the documents N 712/COM and NI 712/COM must be adhered, as well as the user´s instructions. *Further only SPR*

## SPR CONTRAINDICATION

SPR shall not be used in connection with medicals, it is not made for a direct connection to the patient, it is not made for a direct functioning on a body´s part or a kind of tissue. SPR is not made for using in zones G and M written in enclosures 2 of ČSN 33 2140.

## SPR CLASIFICATION

- According to Decree of Government No. 336/2004 as amended to the date of this Guide issues SPR is **a medical device Class 1** (according to rule 1, Appendix. 9), unsterile, without measure function.
- **Electric device of protection class I, type B, installed to the fixed point**, IP20, intended for a continuous operation in medical facility in rooms for universal or special application.

## BASIC INFORMATION ABOUT SPR

SPR is made in according to EN ISO 11197.
SPR is engaged as a holder of the medical device approved by the producer fixed to the terminal connection points.

The arbitrary placing of the SPR in room is enabled by the set of rotary and swivel arms, which are moved manually, and their position is ensured by a special brake.
SPR is supplied unsteriled. Use the desinfection according to the Guide before use.

**When moved the hung device and the arms will intervene into the surrounding room**. Minding of avoiding any collisions with another objects or persons is necessary.

The guarantee period is 24 months if not stated otherwise in the Commercial Conditions. The guarantee and after-guarantee service is provided by MZ Liberec, a.s. or by the accredited service provider, included information about SPR and their parts.

According to law requirments the producer assesses a duty of performing a PERIODIC SAFETY-TECHNICAL CONTROL once per year.
The control can be made by MZ Liberec, a.s. or by the accredited service provider only, that can only make a subject having valid competent authorisation.
The following documentation is passed over with this User´s Guide:
Producer´s Certificate C 712/COM
EC Declaration of Conformity EPS 712/COM
Maintenance Book

User´s Guide 712/COM

This user´s guide is an integral part of SPR and it is necessary to keep it available fot the whole time of using. If any information about SPR are needed (connection diagram, lists of spare parts), it is possible to contact the manufacturer: MZ Liberec, a.s., U Nisy 362/6, 460 01 Liberec 3.

**INSTALLATION CONDITIONS**

DK installation can be made under conditions of environment under condition EN 60721-3-3.

| | | |
|---|---|---|
| K: | Climatic conditions for environment | 3K3 |
| | Working temperatures | +5°C až +40°C |
| | Air humidity | <75%, 10 days a year 95% by +40°C<br>In other days sometmes 85% without condensation, without water from other sources than rain, freeze or ice |
| Z: | Special conditions | 3Z1 (fractional thermal radiation) |
| B: | Biological conditions | 3B1 ((without biota) |
| C: | Chemical conditions | 3C1 |
| S: | Mechanic active substances | 3S1 |
| M: | Mechanic conditions | 3M1 |

Fixing position of SPR
- vertical to the ceiling without shakes or
- perpendicular on the wall without shakes

**BASIC TECHNICAL PARAMETERS**

| | |
|---|---|
| - Protection EN 60529 | IP20 |
| - EN 60601-1 electric apparatus of protection | I |
| - EN 60601-1 electric apparatus of type | B |
| - Electromagnetic compatibility (EMC) | paragraph 36, EN ISO 11197 |
| - supply voltage of electric installation: | max. 230V +10%, -15% |
| frequency | 50 Hz +5%, -5% |
| amperage | max. 16 A for one socket circle |

# SAFETY INSTRUCTION

Before SPR instalation read this Installation Guide and all other documents and follow the instructions.

**Until the proper setting SPR into operation it must be visibly marked by information label „OUT OF ORDER“.**

SPR can be manipulated and serviced only by the persons who have become acquainted with this User´s Guide and other documents supplied with SPR and who passed SPR training made by the manufacturer or his qualified representative.

Only original parts can be used for installation because of keeping electromagnetic compatibility, safety, useful capacity….

Electric conductor inputs and their positions in the room must be designated by the project documentation under a valid technical norm.

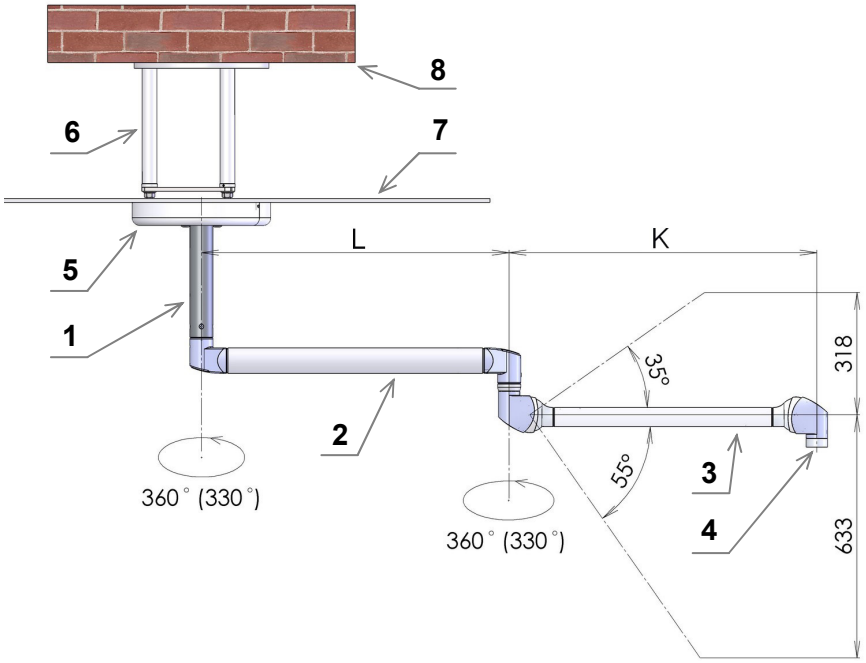
If SPR is connected to electric installation on a building, these must fulfill the norm conditions and safety conditions.

SPR installing and connecting with installations must be done expertly and realisied under valid technical norms, considering each version of SPR.

Installing and completting fulfilling technical norms especially ČSN EN ISO 111197 and ČSN EN ISO 60601-1 take experts of various branches.

Setting SPR into operation must be done, if all specialised subjects ended their work and declared declaration of conformity.

The high adjustment extreme positions of the compact arm ar ethe same for all versions.
For the arms radius of action (reach) see R in Tabelle 3). The high adjustment of the compact arm for x-asis is from +35° to –55°.

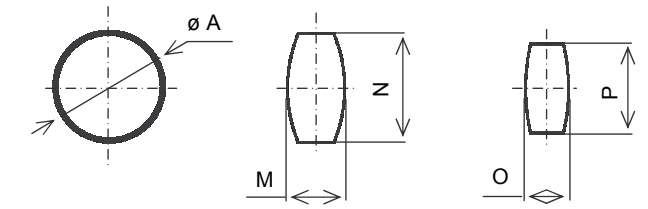



*Legend:*

*1 central axis*
*2 rotary arm*
*3 compact arm*
*4 free end of compact arm For versions see Pic. 5)*
*5 lower ceiling cover*
*6 spacer*
*7 lower ceiling*
*8 ceiling*

*Note.: Lengths of arms L,K are in Tabelle 3) of this Guide.*

*Pic.1) SPR uno with free vertical end*




*Central axis side view Rotary arm side view Compact arm side view*

*Pic. 2) Main parts profiles*

*Tab.1) Profiles*

| Basic parts | SPR10 | SPR11 |
|---|---|---|
| A | 102 | 60 |
| M | 54 | 42 |
| N | 100 | 66 |
| O | 42 | 40 |
| P | 66 | 50 |

# MARKING OF PODUCTS

**SPR / nn – X.Y.Z / nn – X.Y.Z / …**

Short product name

**nn** –type of arm
**10** – type SPR10
**11** - type SPR11

**X* –** length of rotary arm

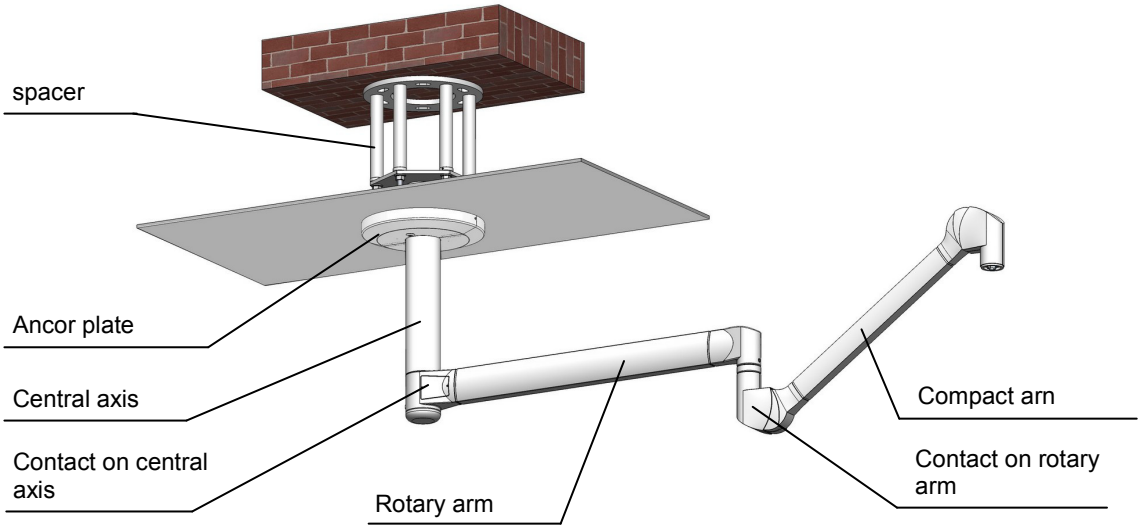
| *SPR10* | *SPR11* |
|---|---|
| 1100 | 1100 |
| 900 | 800, 900 |
| 700 | 700 |

*the longer arm is always located above the shorter one

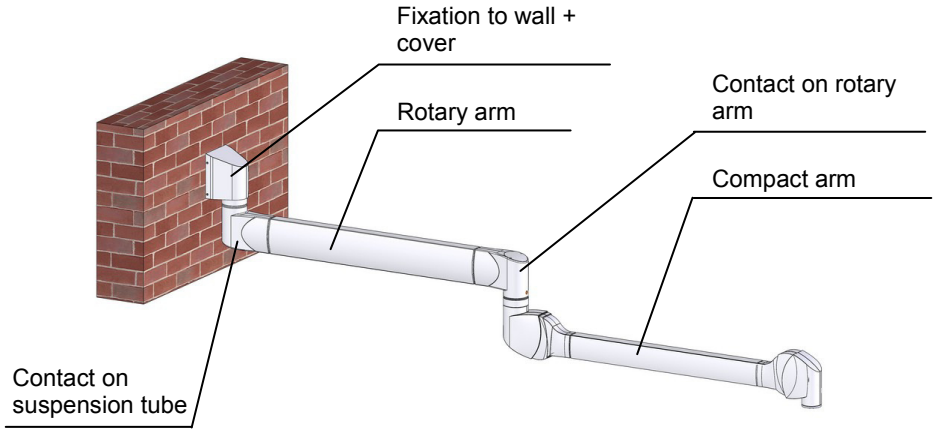
**Z** – free end version
**V** – version with stabilaser (vertical free end)
**H** – version without stabilaser (horizontal free end)

**Y** – electroinstallation version
**N** – version with uninterrupted wires
**O** – version with rotary contacts

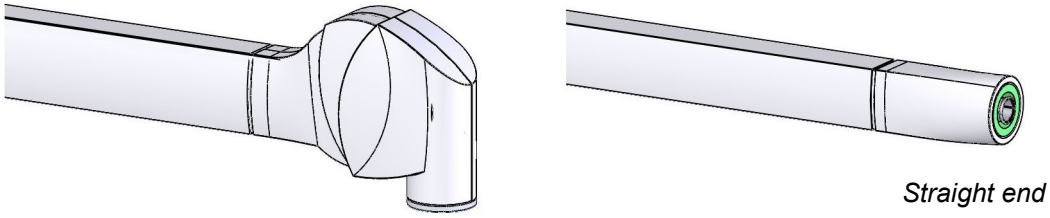
# BASIC PARTS OF SPR




*Pic.3) Basic parts of SPR – ceiling anchorage*




*Pic.4) Basic parts of SPR – wall anchorage*




*Pic. 5) Free ends of a compact arm*

# ANCHORAGE OF SPR

According to the SPR type its anchorage is done on the horizontal or vertical load bearing construction.

The kind of solution, dimensioning and safety multiples of SPR anchorage, as well as accuracy of spacing of anchoring holes must be stated by expert (structural engineer) for each concrete case, regarding the kind and state of building structure, SPR weight and other important effects.

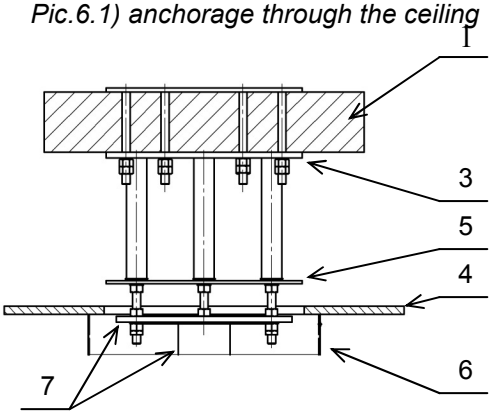
# TYPES OF ANCHRAGE OF ANCHOR PLATE AND SPACER on a horizontal construction

The spacer is intended for height reduction of the installed SPR. It is used in the case that there is a suffit in the concrete room, where the SPR is to be installed to, or if the room is higher than the optimal installation height of SPR is.
Regarding the ceiling construction state there are three versions of anchorage of anchor plateand spacer there:

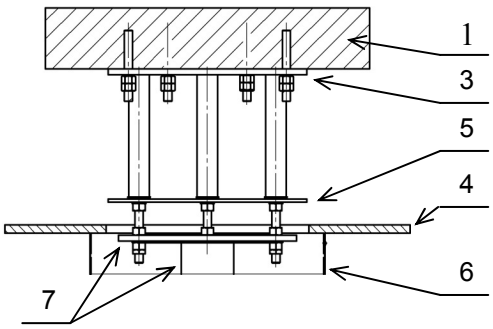
a) through the ceiling, Pic. 6.1,2
*b)* in the ceiling, Pic. 7.1,2
*c)* on ceiling enforcement construction, Pic. 8.1,2

ANCHORAGE WITH SPACER

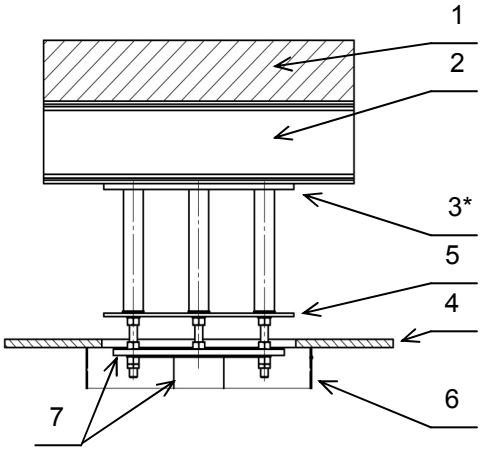
*Pic.6.1) anchorage through the ceiling*




*Pic. 7.1) anchorage in the ceiling*

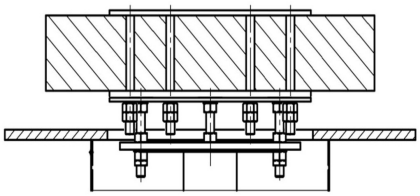



*Pic. 8.1) anchorage on ceiling enforcement construction*

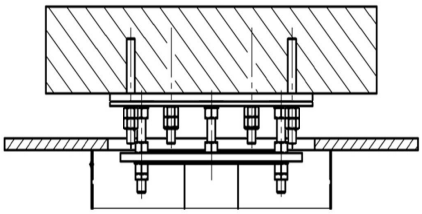



ANCHORAGE WITHOUT SPACER

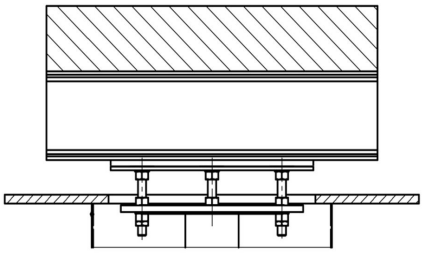
*Pic. 6.2) anchorage through the ceiling (normally without the suffit))*



*Pic. 7.2 anchorage in the ceiling (normally without the suffit)*



*Pic. 8.2) anchorage on ceiling enforcement construction (normally without the suffit)*



*Legend*

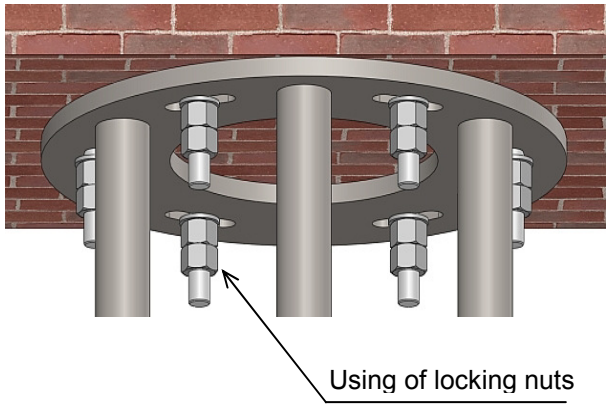
*1 – ceiling construction*
*2 - enforcement construction*
*3 – anchor plate*
*3* – anchor plate welded to enforcement construction*
*4 – suffit*
*5 – bottom spacer plate*
*6 – suffit cover*
*7 – SPR and top SPR plate*

# PROCESS OF ANCHORAGE OF ANCHOR PLATE AND SPACER on the ceiling

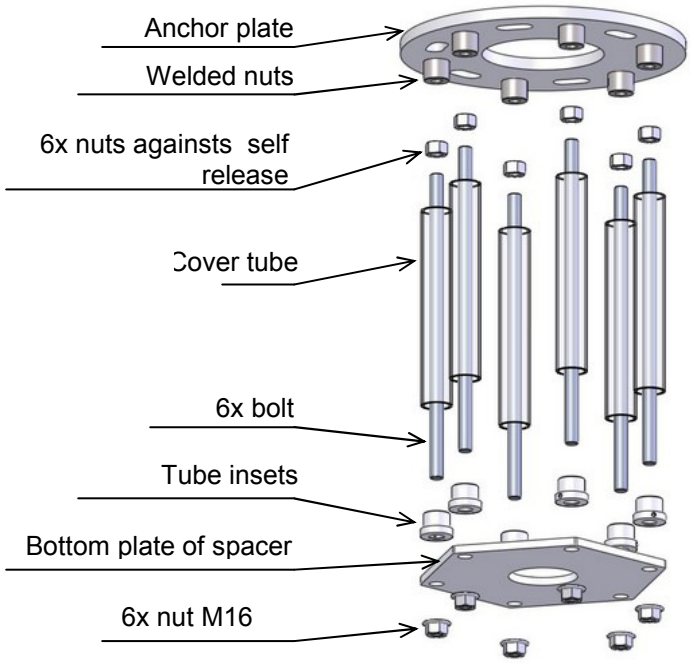
1. Structural engineer will proffessionally state the way of the ancor plate anchorage to the ceiling construction. There are 22mm wide slots situated in the ancor plate in the circle of 270mm diameter in 60° spacing.
2. Set the ancor plate correctly in axes x,y,z in its horizontal position so that SPR is installed straight in its axes and the load powers are uniformly distributed.
3. After installing the anchor plate on the ceiling fix it with couplers against self-release of this

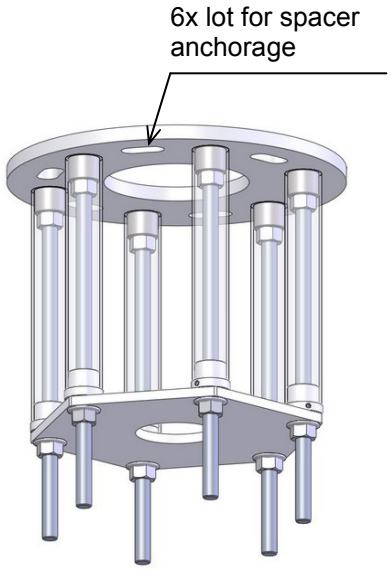
connection (see usaje of locking nuts *Pic. 9*).

4. Tighten the nuts by 100 Nm moment.
5. There are nuts 6x M16 welded on the anchor plate in distance of 60° Pic 10a). Screw bolts on them and reinsure them by nuts against thein self-release.
6. Install cover tubes on the bolts so that they are situated close to the anchor plate.
7. Place the tube insets on the bolts with their smaller outsider diameter upside. After their proper establishment, fix the insets against movement by tightening the safety screw, which is placed on thein larger outsider diameter.
8. Place the bottom plate of the spacer on free bolts ends and fix by nuts M16.
9. Set the spacer in horizontal position.
10. Tighten the nuts by 100Nm moment.




*Pic.9) anchorage of anchor plate to ceiling and its fixation*



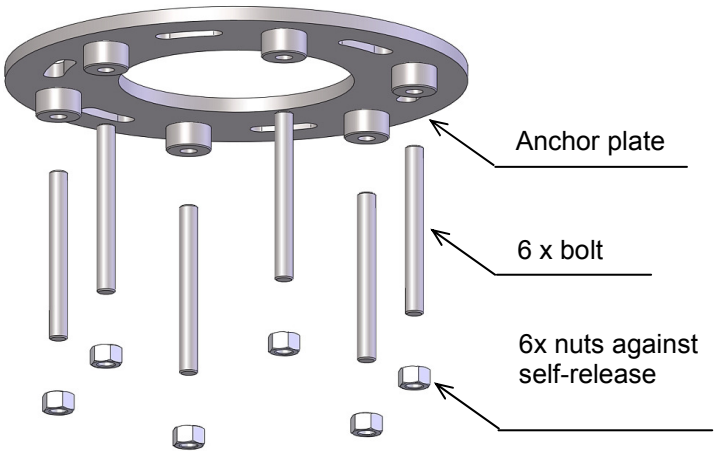

*Pic. 10a) spacer before assembly* *Pic. 10b) spacer after assembly*

# PROCESS OF ANCHORAGE OF ANCHOR PLATE WIHOUT SPACER ON THE CEILING

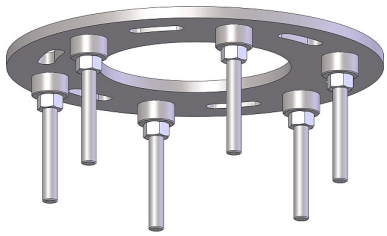
1. Structural engineer will proffessionally state the way of the anchor plate anchorage to the ceiling

construction. There are 22mm wide slots situated in the anchor plate in the circle of 270mm diameter in 60° spacing.

2. Set the ancor plate correctly in axes x,y,z in its horizontal position so that SPR is installed straight in its axes and the load powers are uniformly distributed.
3. After installing the anchor plate on the ceiling fix it with nuts against self-release of this connection (see usage of locking nuts *Pic. 9*).
4. Tighten the nuts by 100Nm moment.
5. There are nuts 6x M16 welded on the anchor plate in distances of 60° *(see Pic. 11a)*. Screw bolts on them and reinsure them by nuts against thein self-release.
6. Tighten the nuts by 100 Nm.




*Pic. 11a) anchor plate before assembly*



*Pic.11b)anchor plate after assembly.*

# INSTALLATION GUIDE FOR SPR ASSEMBLY

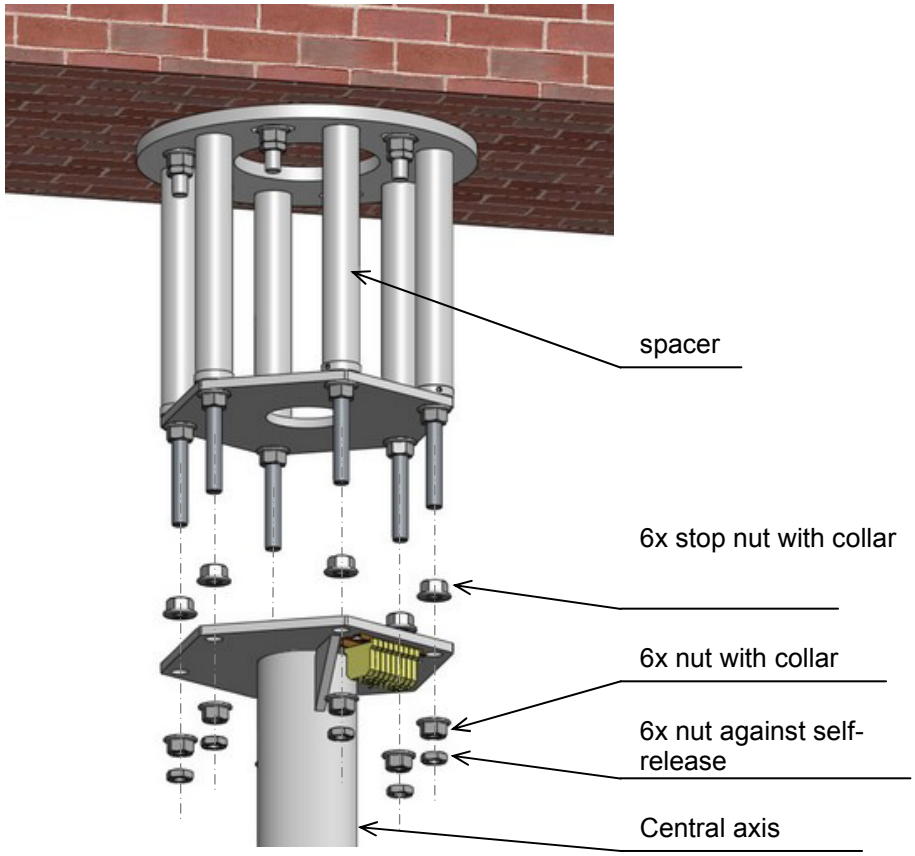
SPR is installed according to the concrete room situation or on already prepared spacer (Pic. 12) or on anchor plate (Pic. 14). The way of SPR installation (with or without spacer) must be stated by the respective structural engineer.

## *PROCESS OF INSTALLING SPR CENTRAL AXIS TO ANCHOR PLATE USING SPACER*

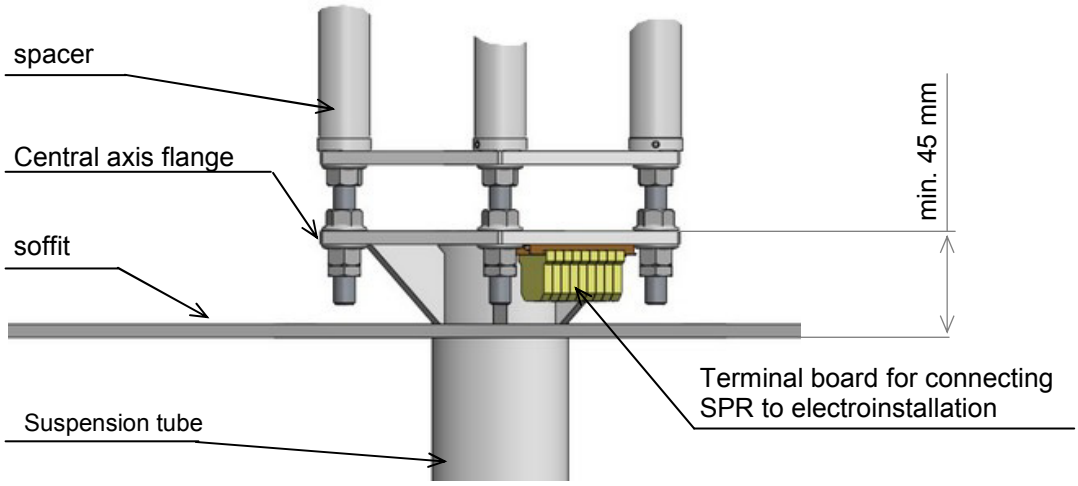
1. Unwrap SPR from its protection wrappage and přepade it for installation.
2. If SPR is supplied in version with stop sof the rotary parts, their rotation is limited in the scope of cca 325°. Check, in what position the stop screw is and orientate SPR accordingly so that its rotation corresponds with the request on its rotation.
3. Screw the stop nuts with collar on free ends of bolts and match them in level with the help of air level. After their adjustment fit the central axis flance on place.
4. **Set the central axis flange in the distance 45mm min and 80mm max above the suffit bottom (Pic. 13).**
5. Fix the central axis flange to spacer by 6 nuts with collar so that it closely adjoins to all stop nuts with collar.
6. **Set the central axis in vertical position by adjusting stop nuts** with the help of air level**.**
7. Fix the nuts holding the central axis flange against the self-release by 6 nuts (*Pic. 12)***.**
8. **Check the central axis position to vertical and horizontal level.** If necessary adjust SPR position

accordingly.

9. Tighten all nuts by 100 Nm.




*Pic. 12) Installing SPR to spacer*

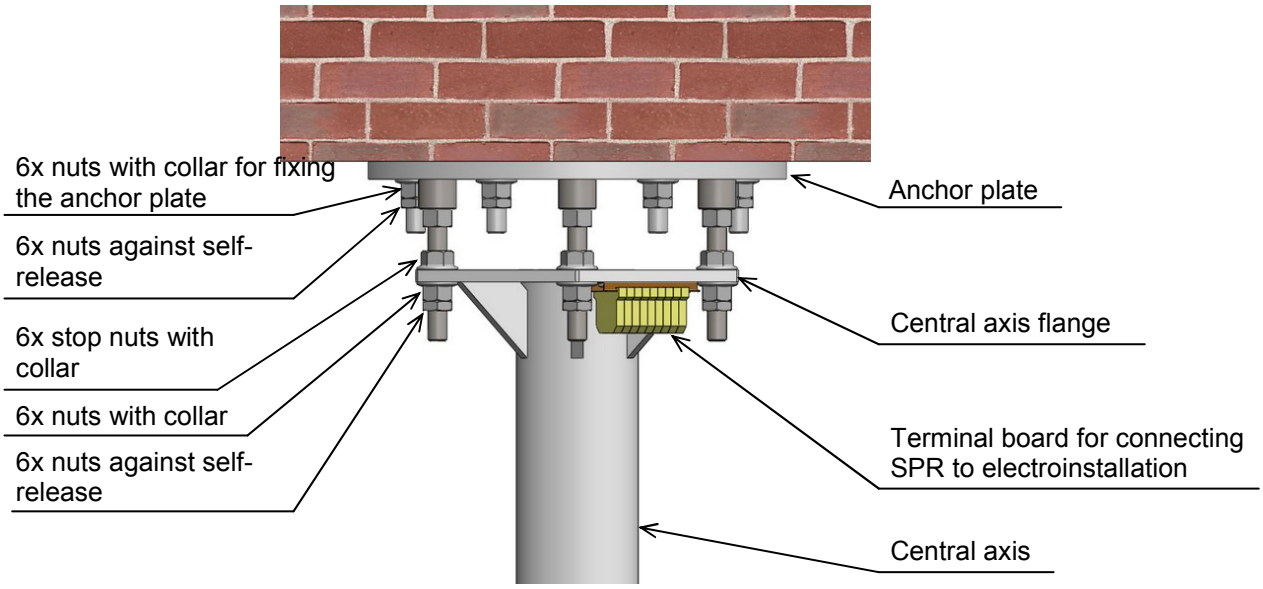



*Pic. 13) Placing SPR to soffit*

## *PROCESS OF INSTALLING SPR CENTRAL AXIS TO ANCHOR PLATE WITHOUT SPACER*

1. **Unwrap SPR from its protection wrappage and prepare it for installation**.
2. If SPR is supplied in version with stops of the rotary parts, their rotation is limited in the scope of cca 325°. Check, in what position the stop screw is and orientate SPR accordingly so that its rotation corresponds with the request of its rotation.
3. Screw the stop nuts with collar on free ends of bolts and match them in level with the help of air level. After their adjustment fit the central axis flange on place.
4. Fix the central axis flange to spacer by 6 nuts with collar so that it closely adjoins to all stop nuts wit collar.
5. Fix the nuts holding the central axis flange against the self-release (*Pic. 14)*.
6. **Check the SPR central axis position to vertical and horizontal level. If necessary adjust SPR position accordingly.**
7. Tighten all nuts by 100 Nm moment.

The further process is the same as by installing SPR with spacer.




*Pic 14 ) Installing SPR without spacer*

## *PROCESS OF INSTALLING SPR ON THE WALL*

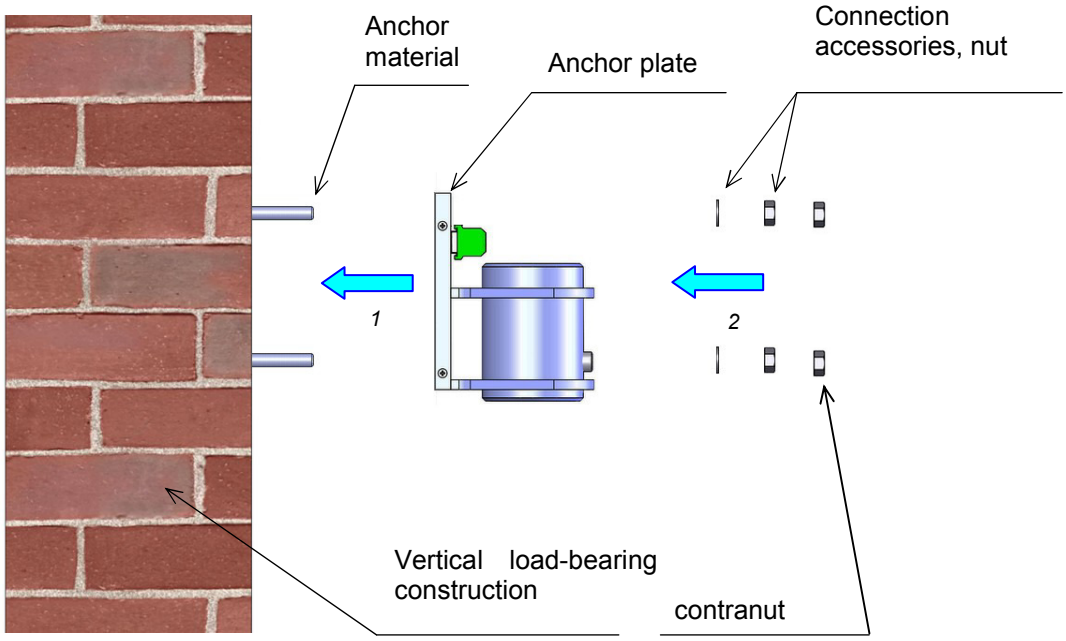
1. Structural engineer will professionally state whether the vertical loading capacity is sufficient for the chosen type of SPR anchorage regarding the whole weight and load of SPR and the way of its usage, or if the wall must be enforced and which way the enforcement is to be done.
2. Structural engineer will professionally state the way of the anchor plate anchorage to the vertical load bearing construction. There are 4 slots of ø 8,5 mm situated on the anchor plate.
3. Fix the anchor plate to the load bearing construction by connection accessories (use underlays) and set it correctly in axes x,y,z in its horizontal position using the air level.
4. Place the hinge pivot into the hinge bushing from the bottom side until the pivot is closely adjoined to the bottom edge of the hinge bushing. While holding it to prevent a rotary arm fall, place three

adjusting shims on the hinge pivot (the plastic adjusting shim is to be placed between the metal ones) and fix them by Seeger clip ring.

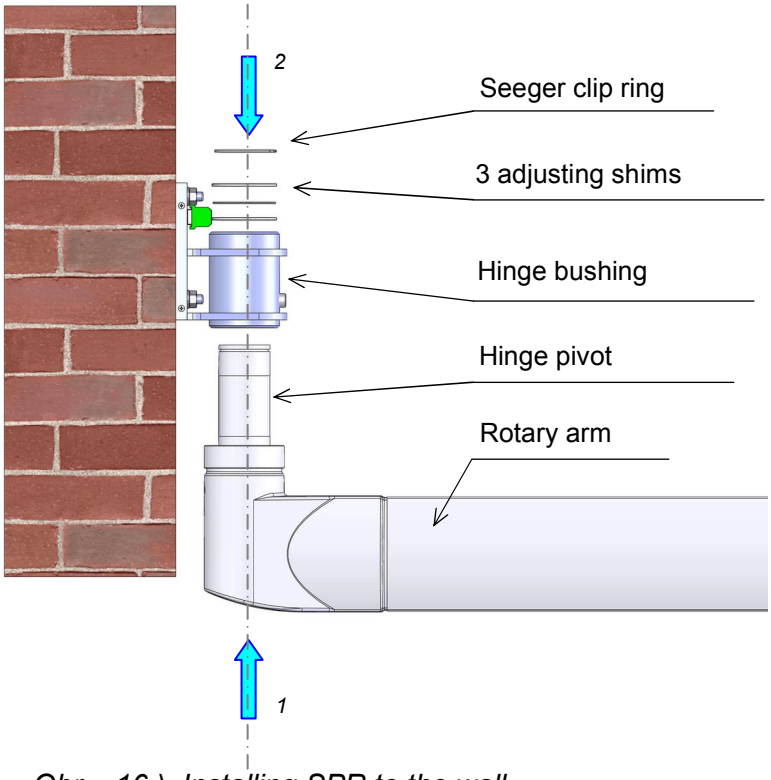
5. Check the anchor plate and the rotary arm correct position in x,y,z axes. If necessary adjust SPR position accordingly using the air level and tighten properly all connecting accessories.
6. Fix the anchor plate by the connection accessories against self-release (e.g. by using locking nuts see *Pic. 15*). Tighten all nuts by 100 Nm moment.

*If the rotary and compact arms are not connected, follow the instruction of chapter X.*

*Install the cover of the anchor plate following the instruction of chapter IX.*




*Pic. 15 ) Installing SPR to the wall*




*Obr. 16 ) Installing SPR to the wall*

# INSTALLATION OF CEILING COVER

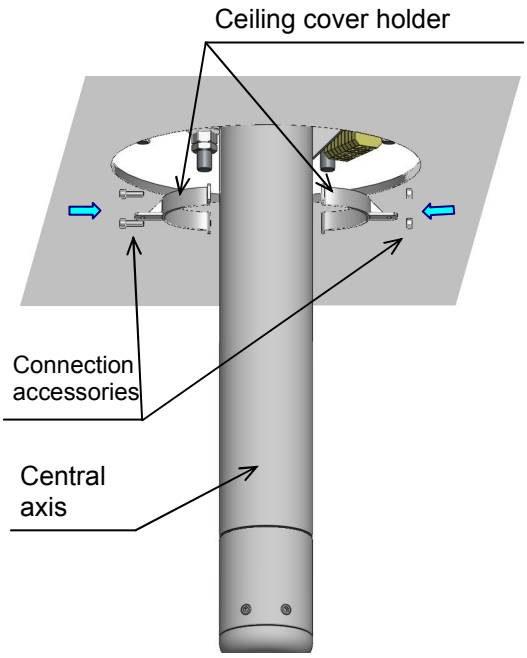
**Installation of covers with faulty couplers or another damages is forbidden.**

**Couplers of all covers must lock together all slony thesurface contact.**

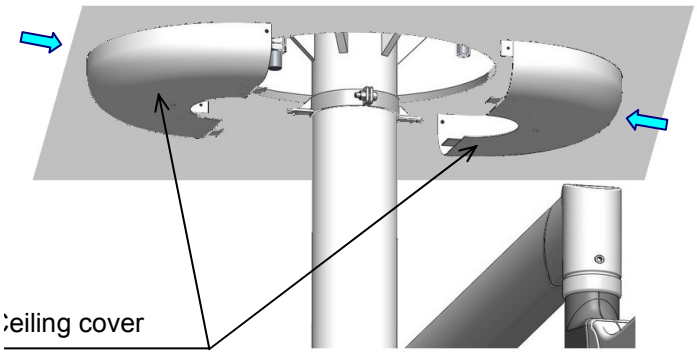
**Operating SPR without properly installed covers is forbidden.**

The holder of the ceiling cover and the ceiling cover consist of two halves each..

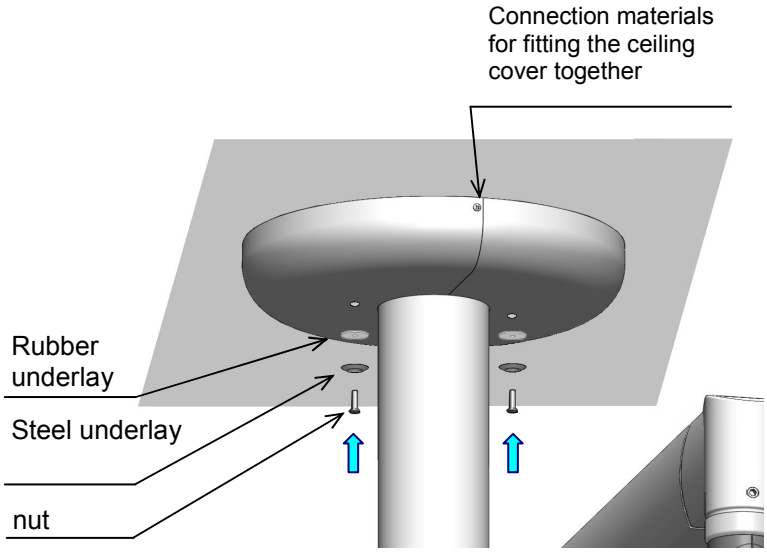
1. Place both halves of the ceiling cover to the central axis so that they surround it.
2. Connect both halves with connection accessories.
3. Place the ceiling cover holder into the correct position under soffit/ceiling, so that the subsequently installed cover adjoins closely to the suffit/ceiling..
4. Tighten the ceiling cover holder by connection accessories properly, so that its position does not change after ceiling cover installation.
5. Earth both halves of the ceiling cover by connecting to the earthing screw or to the terminal board.
6. Fit the both halves of the ceiling cover together to the holder, so that the counters located on both ends of the cover lock together.
7. Connect the ceiling cover by connection accessories in the top part of the cover.
8. Fix the ceiling cover to the holder by connection accessories using steel and rubber underlays.




*Pic. 17a) Installation of ceiling cover holder*




*Pic. 17b) Fitting of the ceiling cover together*




*Pic. 17c) Fixing of ceiling cover*

# INSTALLATION OF WALL COVER

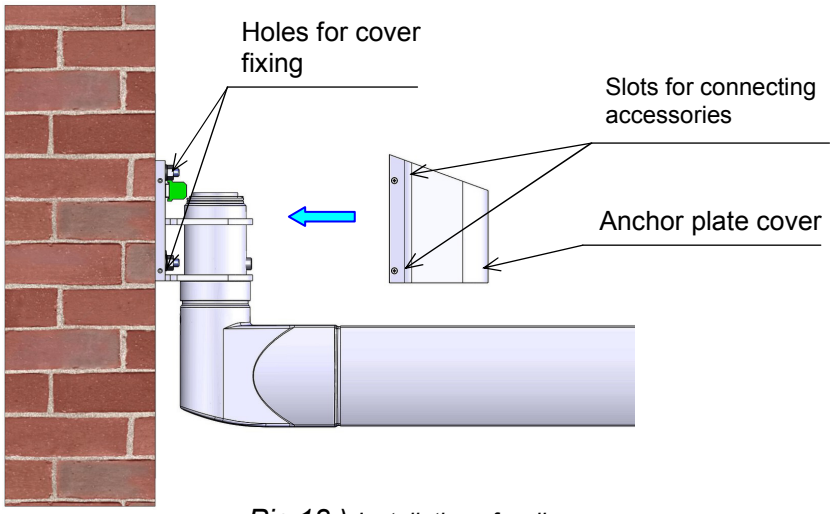
**Installation of covers with faulty couplers or another damages is forbidden.**

**Couplers of all covers must lock together all along the surface contact.**

**Operating SPR without properly installed covers is forbidden.**

1. Place the cover to the anchor plate, so that the slots in its sides coinside with the holes in the anchor plate.

2. Screw the cover by connection accessories to the anchor plate and tighten the screws properly.




*Pic.18 ) Installation of wall cover*

# CONNECTING ROTARY ARM WITH COMPACT ARM

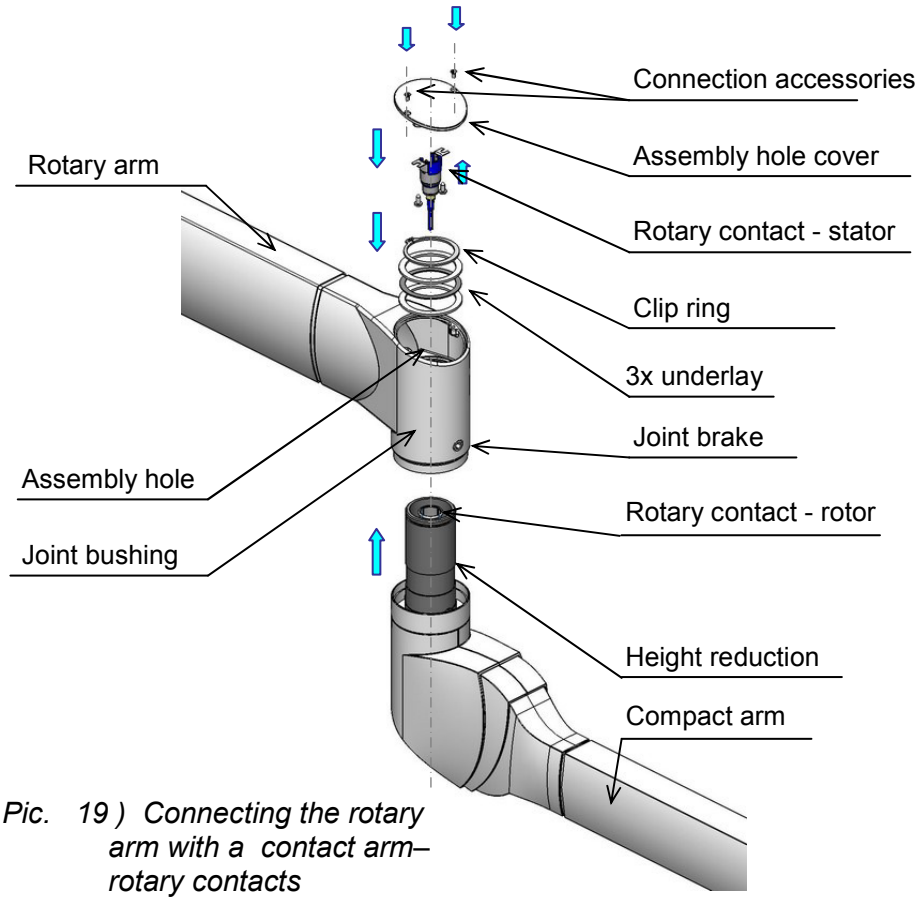
If the rotary arms are not connected with compact arms, connect them as described bellow:

## *A. PROCESS FOR INTERRUPTED WIRE (USING ROTARY CONTACTS)*

1. Unscrew the connecting accessories and release the cover of the assembly hole. Remove the cover together with the rotary contact – stator.
2. Unscrew th joint brake.
3. Insert the height reduction into joint socket regarding the wires, so that they are not damaged.
4. In the assembly hole place three underlays onto the height reduction (plastic underlay is to be placed between the metal ones).
5. In the assembly hole place the clip ring into the channel in the height reduction.
6. Screw the joint brake in.
7. Insert the rotary contact (stator), which is firmly connected with the cover of the assembly hole, into the totary contact (rotor) placed in the height reduction so that the cover of the assembly hole adjoins closely and covers the assembly hole.
8. Fix the cover of the assembly hole by connection accessories.

## *B. PROCESS FOR UNINTERRUPTED WIRE (NOT USING ROTARY CONTACTS)*

1. unscrew the connecting accessories and release the cover of the assembly hole, remove the cover.
2. Unscrew the joint brake.
3. Lead th ewires out through the top assembly hole.
4. Insert the height reduction into the joint socket regarding the wires, so that they are not damaged.
5. In the assembly hole place three underlays onto the height reduction (plastic underlay is to be placed between the metal ones).
6. In the assembly hole place the clip ring into the channel into the height reduction.
7. Lead free ends of wires consequently and the whole wires through the hole in the height reduction, th ewires must be layed without their twisting.
8. Screw the joint brake in.
9. Fix the cover of the assembly hole by connection accessories.




*Pic. 19 ) Connecting the rotary arm with a contact arm– rotary contacts*

# COMPACT ARM COMPLETING

SPR are produced prearranged and effectually completed with electroinstallation specified by the respective projects and by the customer.

If not prepared in the production, the uninterrupted wires (power, signal and earthing) must be lead through the arms, as shown at Pic*. 20.*

All electric wires must be lead and connected in accordance with the electroscheme designed for the concrete SPR. The scheme is sticked on the inner side of the ceiling cover.

The wires must be lead in the joints with regard to their movement scope, so that the wires are not exposed to the increased abrasion or chafing, or to unsuitable stretching on the contrary.

Terminal board must not be used for looping.

## *A. EARTHING WIRES INSTALLATION*

Earthing wires are terminated by cable lugs.

1. **At the earthing point place the serrated lock washer between EACH cable lug and the earthing screw**.
2. Lead the earthing wire pulled through the rotary arm and the earthing wire designated to connect the earthing points 1 and 2 to the earthing point 1. Fix these earthing wires to the earthing point 1 by earthing screw and tighten it properly.
3. Pull the earthing wire through the compact arm. Lead the wire under the stabilazer pivots and in the inner part of the stabilazer.
4. Lead the free end of the earthing wire connecting earthing points 1 and 2 and the earthing wire connecting the earthing points 2 and 3 to the earthing point 2. Fix these earthing wires to the earthing

point 2 by earthing screw and tighten it properly.

5. Lead the free end of the earthing wire connecting earthing points 2 and 3 to the earthing point 3. Fix it to the earthing point 3 by earthing screw and tighten it properly.

## *B. INSTALLATION OF POWER AND SIGNAL WIRES BY THEIR INTERCONNECTION*

*Process for SPR supplied with installed wires*

1. The ends of wires installed in rotary and compact arms are fitted with connectors. Join the connectors. When connected, the wires must be lead without restraint so that they can allow the arms rotation to their full extent without any wires damage. When connected the wires must not be twisted or cranked.

**Before joining the connectors to the electric devices these devices must be switched off.**

**Join the devices only after the revision and checking the correctness of the wires connection.**

2. After connecting all wires install the covers according to the Chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.

## *C. INSTALLATION OF POWER AND SIGNAL WIRES BY THEIR PULLING THROUGH*

*Process for SPR supplied without wires installed in compact arm*

1. Lead the wires pulled through the rotary arm under the stabilazer pivots and in the inner part of the stabilazer.
2. Lead the wire pulled through the compact arm through the supporting frame and lead it through the bottom frame hole out..
3. If the end of the wire lead out through the bottom frame hole is not equiped with the connector, install the respective connector.

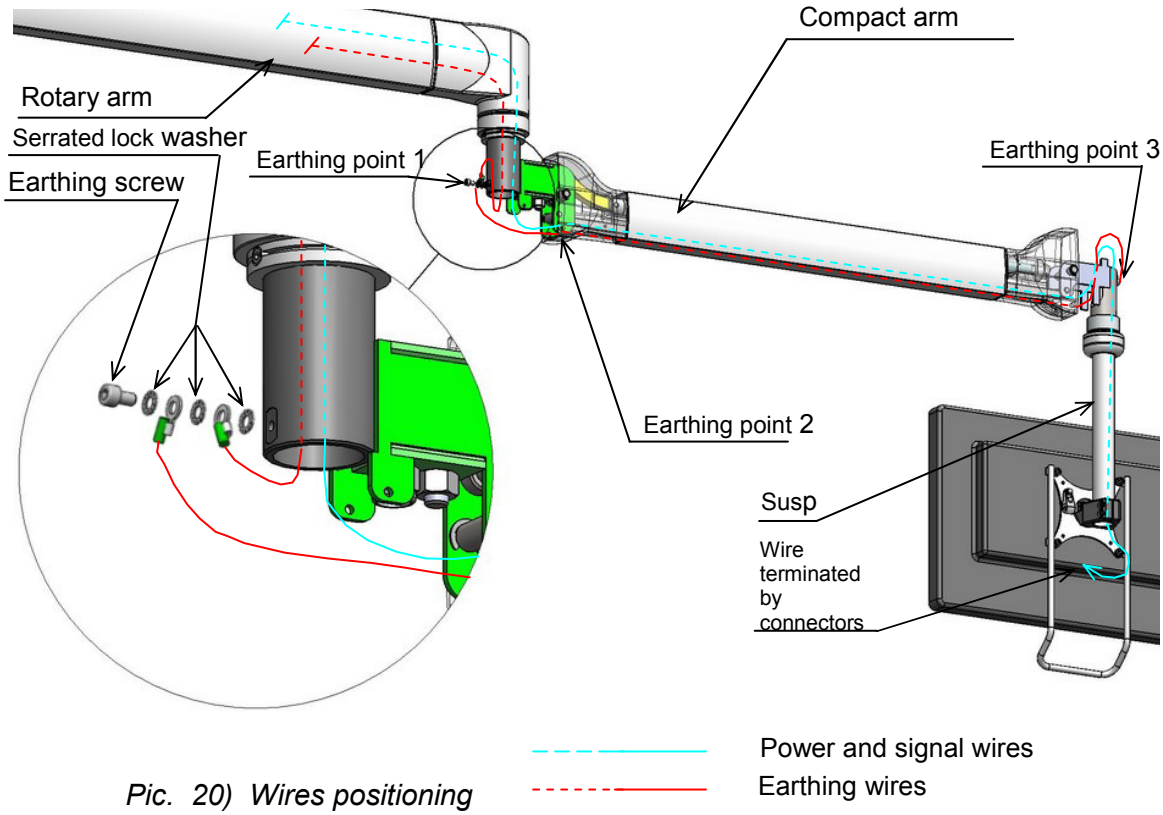
**Before joining the connectors to the electric devices these devices must be switched off.**

**Join the devices only after the revision and checking the correctness of the wires connection.**

After all wires installation proceed:

A Fix the wires lead in stabilazer by tightening binder, which is to be thread through the designated holes in stabilazer.

B Install the covers according to the Chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.




*Pic. 20) Wires positioning*

# STOPS ADJUSTMENT

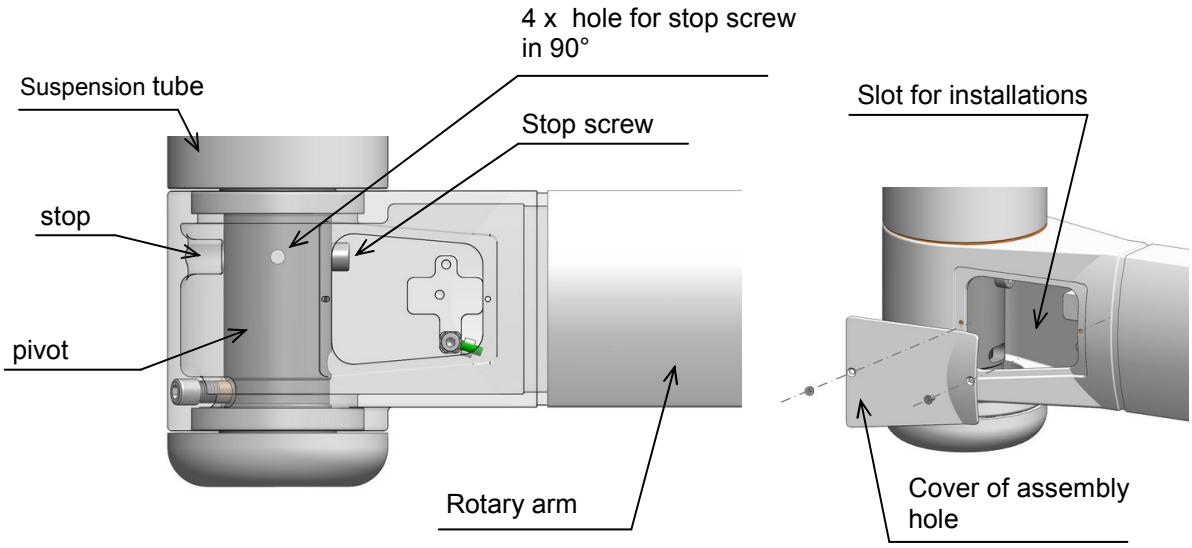
## *A. ADJUSTMENT OF ROTARY ARMS MOVEMENT STOPS (horizontal stops)*

The stops adjustment is done at SPR version with uninterrupted electroinstallation (without rotary contacts).

The stop is prearranged in production. If the stop position change is required according to the room dispositions of the medical workplace, follow the instructions below::

1. Release the cover of the assembly hole
2. Unscrew the stop screw
3. Relocate the rotary arm into the selected position regarding the room dispositions of the medical workplace. **Proceed the arm movement with the regard to the electroinstallation so that the wires are not wound around the pivot.**
4. Screw the stop screw into the hole respecting the selected rotary arm relocation and tighten it properly.
5. After the relocation arrange the wires so that, after their output from the slot for installations, they are loosely wound once around the pivot and then lead to the rotary arm.
6. Place the cover of the assembly hole back.

**If the power and signal installations are damaged, they must be replaced by the new ones. This must be done by a professionally authorized person using original parts.**



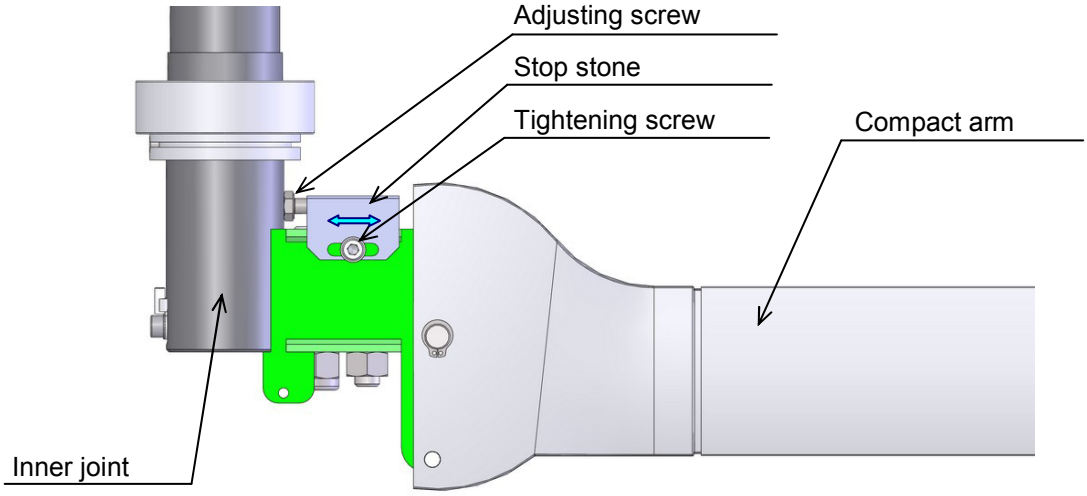

*Pic. 21a ) adjustment of rotary arms movement*

## *B. ADJUSTMENT OF COMPACT ARMS SWIVELING (vertical stop)*

1. If the inner joimt cover is not removed, remove it.
2. Release the tightening screw so that the stop stone can be loosely moved by hand.

**Moving the stop stone changes the scope of the compact arm vertical movement**.

3. Screw the adjusting screw into the stop stone to the maximum depth.
4. Move the stop stone to the requested position.
5. Tighten the tightening screw.
6. Unscrew the adjusting screw from the stop stone so that its head touches the inner joint..
7. Install the inner joint cover according to the chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.




*Pic. 22b) adjustment of compact arm swiveling*

# INSTALLATION OF ADDITIONAL DEVICE

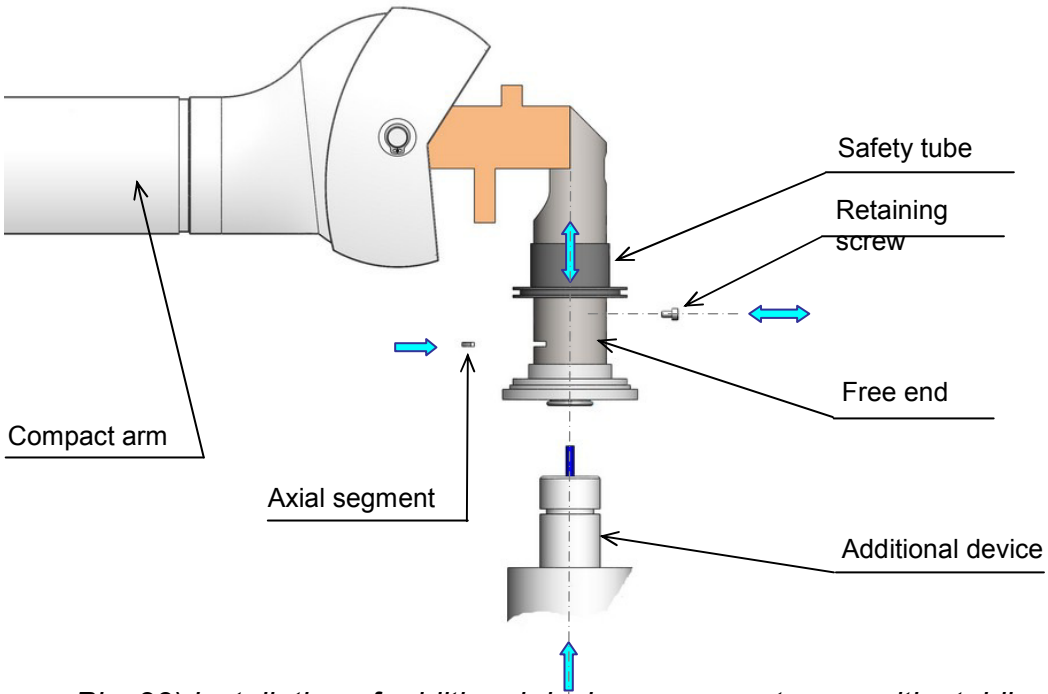
The additional devices according to specifications stated in orders (lights, displays-monitors, cameras…) respective projects and supplied by specialized sobjects in the scope of assembly, eventually prearranged in production can be installed on the free ends of compact arms.

## *A. INSTALLATION OF ADDITIONAL DEVICE – compact arms with stabilazer (vertical free end)*

On the free end of compact arm there can be installed an additional device having the connecting element corresponding with th efree end of the compact arm.

When installing the additional device please keep the following process:

1. Remove the covers of the compact arm and according to the chapter XVIII, INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.
2. Unscrew the retaining screw.
3. Through the safety tube up above the retaining screw hole on the end.
4. Screw the retaining screw back.
5. Check, whether there is not already an axial segment put in the axial segment slot, eventually remove it.
6. Insert the additional device into the free end of th ecompact arm so that the channel of th eadditional device corresponds with the channel of the free end.
7. Insert the axial segment into the channels of free end and additional device. Attend to the axial segment does not release after its locking.
8. Unscrew the retaining screw.
9. Let the safety tube down.
10. Fix the safety tube to the free end by the retaining screw.
11. Install the covers according to the chapter XVIII, INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.

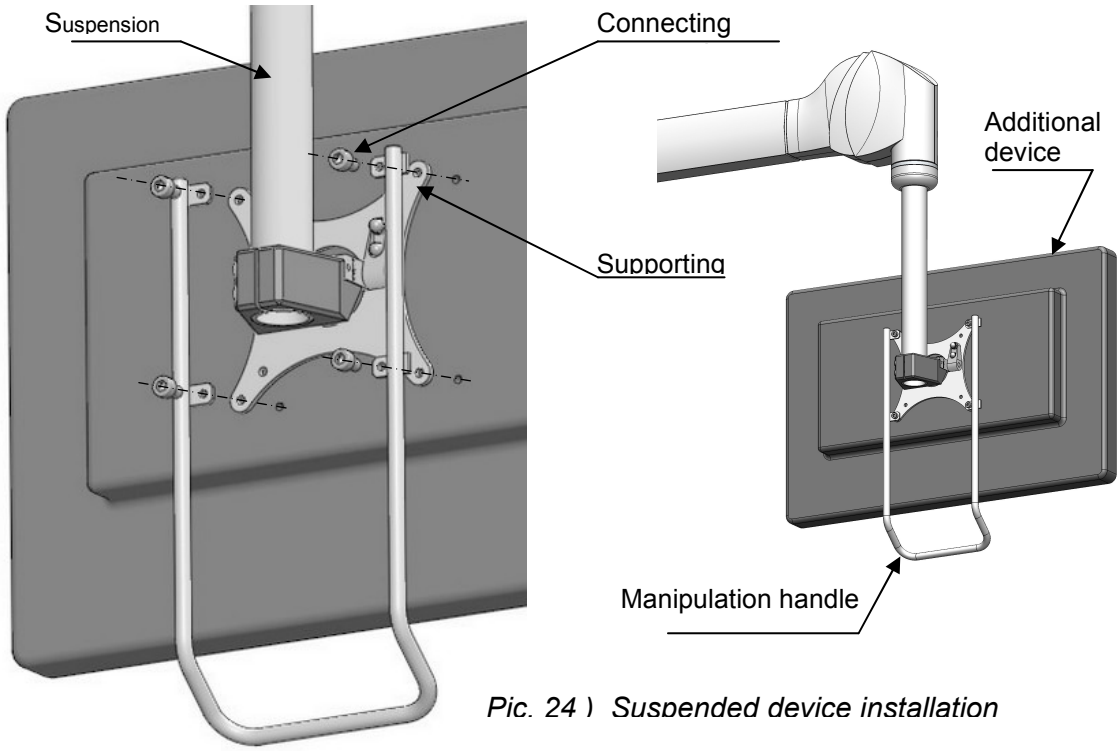



*Pic. 23) installation of additional device – compact arms with stabilazer*

## *B . INSTALLATION OF SUSPENDED DEVICE (monitors)*

The manipulation handles andvsuspended devices can be installed to the supporting element using the connecting accessories.

1. Release screws located on the supporting element sleeve.
2. Put the sleeve on the suspension frame and place the supporting element into the requested position.
3. Fix the supportimg element in the selected position by tightening the screws on the sleeve.
4. Place the manipulation handle to the supporting element so that the holes for connecting accessories of the handle correspond woth holes of the supporting element, and join them with connecting accessories. Usie the spring washers for assembly, tighten the connecting accessories properly.
5. Install the display (monitor) on the supporting element according to its supplier´s instructions.
6. Connect the free ends of power and signal installations lead out from the suspension frame into the respective display´s sockets.

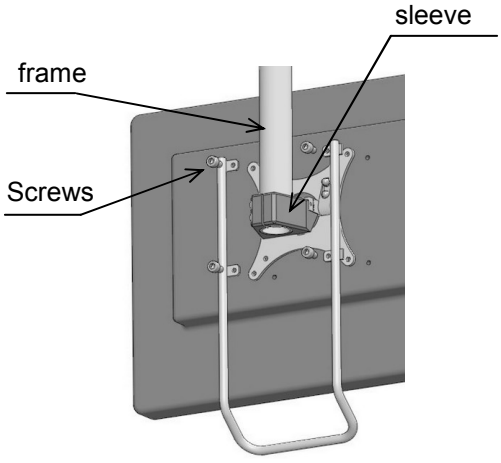



*Pic. 24 ) Suspended device installation*

**Monitor position adjustment**

The position of the monitor can be adjusted to the needs of the operating personell regarding to the medical workplace dispositions. The sleeve can be rotated on the frame to the required position regarding to the prevention of wires twisting.

1. Release screws located on the supporting element sleeve.
2. Orientate the supporting element to the requested position.
3. Fix the corresponding element in the selected position by tightening the screws on the sleeves.




*Pic. 25 ) Monitor position adjustment*

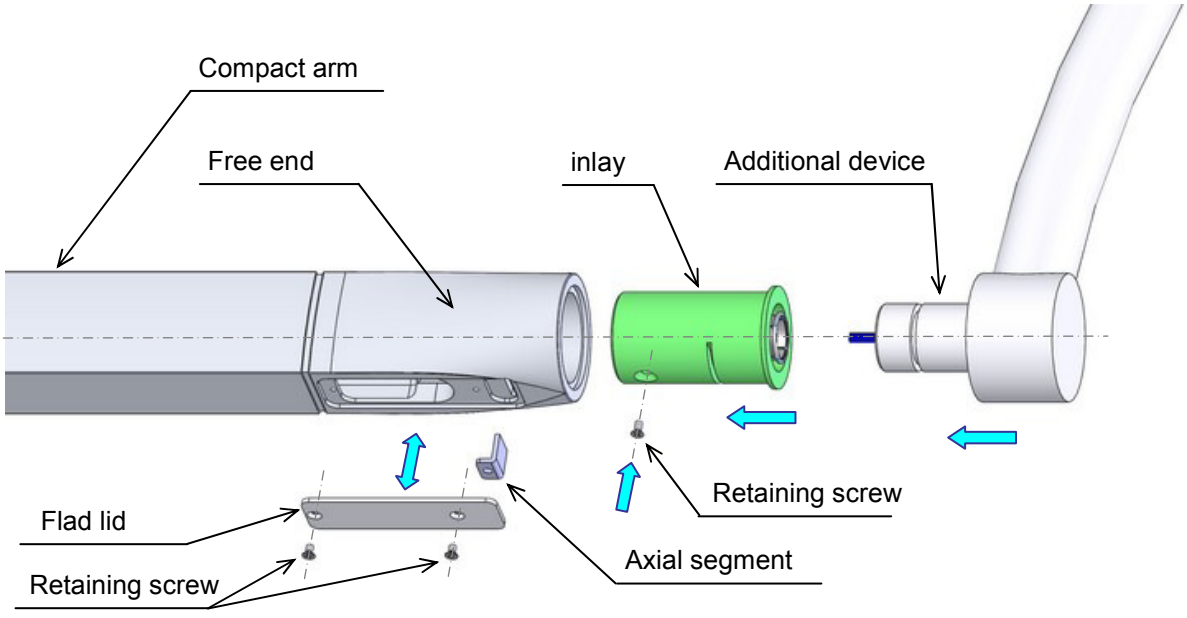
**(!) After the suspended devices dismounted from the compact arm the reaction (weight of the suspended devices)**
**acting counter to the adjusted spring tension is removed. Consequently the compact arm will spontaneously move**
**upwards (to the SPR vertical axis). Compact arm must be fixed against the self-motion before dismantling the suspended device, and after dismantling must be manually moved into the top extreme position.**

## *C. INSTALLATION OF ADDITIONAL DEVICE – compact arms without stabilazer (straight free end)*

**Compact arms without stabilazer have free end in long axis in the whole operating range.**

On the free end of compact arm there can be installed an additional device having the connecting element corresponding with the free end of the compact arm.

1. Unscrew retaining screws of the flat lid.
2. Remove the axial segment and subsequently remove the inlay, check the inlay retaining screw fastness
3. Insert the additional device into inlay
4. Insert the inlay with the additional device into the free end and fix it by axial segment.
5. Place the flat lid back and tighten it properly by the retaining screws




*Pic. 26 ) installation of additional device – compact arms without stabilazer*

# FINE ADJUSTMENT OF COMPACT ARM

Range of the compact arm adjustment is for the loads of weight:

**SPR10 4 to 26 kg**

**SPR11 0 to 14 kg**

For details see Table 3) Maximal adjustment for each arm in this Giude.

Compact arm can have a factory preset spring preload. Its final fine adjustment is done in the place of installation.

The suspended equipment is adjusted if, after its dislocation, it is stable (not moving down or up) in the extreme position.
The fine adjustment of the compact arm does not allow adjusting the carried loads in the whole range

defined for the named SPR version. **The fine adjustment has a scope of ± 4 kg (8 kg).** If the request of the loading capacity change is larger than achievable by the fine adjustment, the rough adjustment stated in chapter XVII. ROUGH ADJUSTMENT OF COMPACT ARM of this Installation Guide must be proceeded.

The fine adjustment is made by the imbus spanner after the suspended devices installation.

**During all the time of manipulation with the compact arms the high causion must be applied. The compact arm can have a preset spring preload. After its tilting and consequent releasing the compact arm will self-move upwards (to the vertical SPR axis) and can cause any hurt or damage.**

**PROCESS OF FINE ADJUSTMENT OF COMPACT ARM:**

1. Remove the covers on the compact arm according to the chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.

2. Fix the compact arm in horizontal position according to the chapter XIX. LOCKING THE COMPACT ARM
IN A POSITION. The horizontal position is necessary for fine adjustment availability. Attempts for the fine adjustments when the arm is in the extreme position will cause the damage of the compact arm mechanism.

3.Rotate the stressing screw by the imbus spanner (see pic. 22). The stressing screw can be rotated by rotating a nut covering the screw using the respective impact socket.

a.By rotating the stressing screw from the right to the left, i.e. anti-clockwise, the spring preload is raised *(for adjusting heavier weights)*

b.By rotating the stressing screw from the left to the right, i.e. clockwise, the spring preload is reduced *(for adjusting lighter weights).*

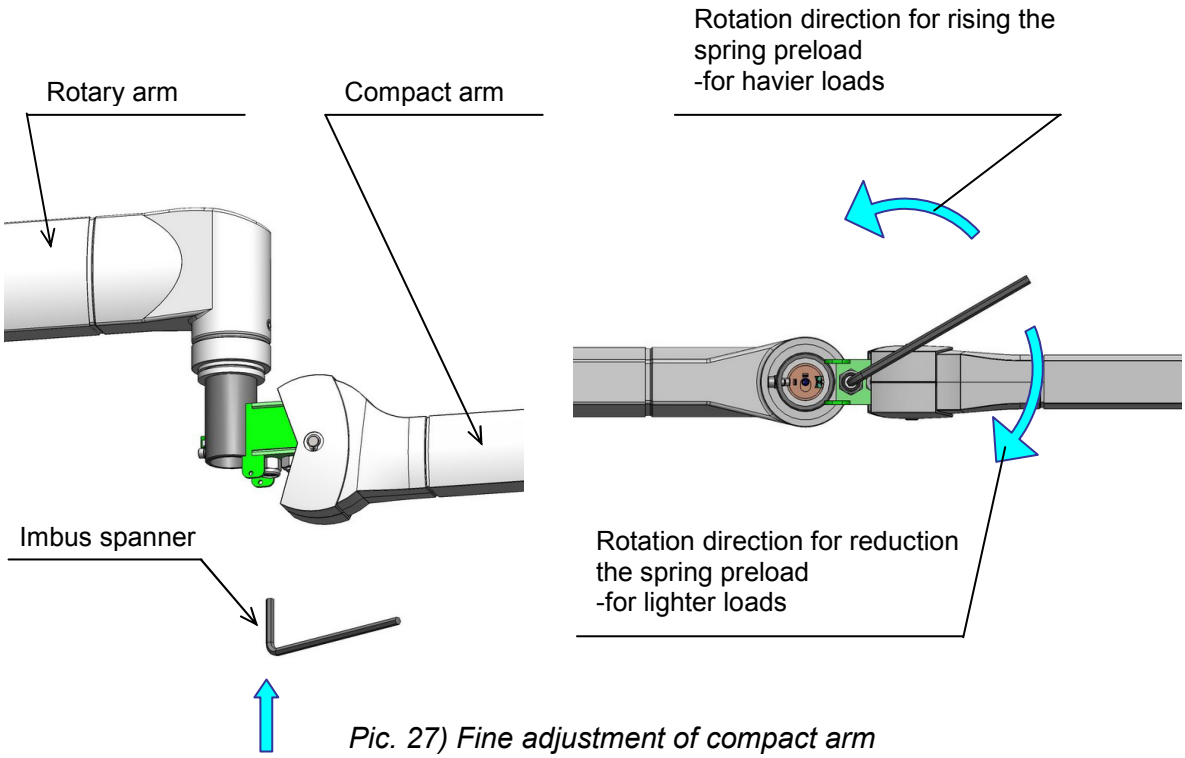
*There is nut screwed and tightened on the stressing screw. It could be released when turning the stressing screw by an imbus spanner. Check whether the nut has not been released by turning the stressing screw. If the nut is released it must be duly tightened again – hold the stressing screw against its rotation by an imbus spanner and tighten the nut by a spanner.*

Close to the stressing screw the spring´s guide-pin is situated. Any manipulation with this guide-pin is forbidden. Proceed the adjustment by the screw using the imbus spanner only. The adjustment screw is located closer to the rotary arm.

4.Check the load stability both in extreme and horizontal positions. The load must be stable in a chosen position, it means it must not move upwards or downwards. If the load is not stable, repeat the adjustment process.

*Note: The load stability check is to be done without steel locking rod.*

5.Install the covers according to the chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.




*Pic. 27) Fine adjustment of compact arm*

# ROUGH ADJUSTMENT OF COMPACT ARM

Rough adjustment of compact arm is done when fine adjustment does not allow balancing of carried load.

Rough adjustment can be proceeded after removing the connecting elements of the carried load only.

The power balance in the arm changes during the rough adjustment (the arm may move up or down), that is why the arm must be properly fixed in the horizontal position.

## *A. ROUGH ADJUSTMENT OF COMPACT ARM WITH VERTICAL FREE END* **(see Pic.28)**

1. Remove the covers on the compact arm end according to the chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide (if the covers are already installed).

Fix the compact arm in horizontal position according to the chapter XIX. LOCKING THE COMPACT ARM IN A POSITION.

2. Release and remove the clip ring from the pintle.
3. Remove the pintle (pintle removal will release the vertical free end).
4. Unscrew and consequently remove the sliding block using the spanner
5. Insert the spanner into the compact arm and place it on the steel nut inside the compact arm.

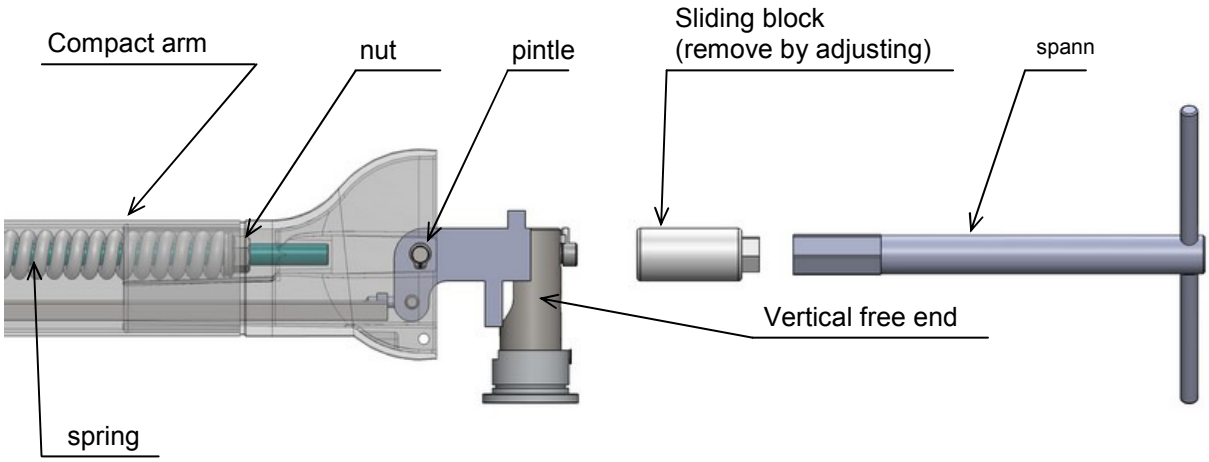
6. Unscrew the nut so that the spring preload is fully released and the nut touches the spring without pressing it. This way the power in the arm is released and the compact arm falls downwards spontaneously.

7. Screw the nut according to the spring preload request regarding to the carried load weight in accordance with values stated in Tabelle 2 of preload setting.

*Tab. 2) Preload setting*

| SPR10 | | SPR11 | |
|---|---|---|---|
| setting of spring preload for carried loads weights in the scope of | number of turns *in state of unpressed spring* for setting the requested spring preload | setting of spring preload for carried loads weights in the scope of | number of turns *in state of unpressed spring* for setting the requested spring preload |
| 4 – 8 kg | 28 turns | 0 – 5 kg | 44 turns |
| 8 – 16 kg | 35 turns | 5 – 10 kg | 74 turns |
| 12 – 26 kg | 55 turns | 10 – 14 kg | 100 turns |

8. After setting the requested spring preload remove the spanner.
9. Insert the sliding block into the compact arm and tighten it so that it closely touches the nut.
10. Return the vertical free end into its original position and fix it in compact arm by pintle.
11. Fix the pintle by the clip ring.
12. If necessary proceed the fine adjustment of the compact arm accordind to the chapter XVI. FINE ADJUSTMENT OF COMPACT ARM of this Installation Guide.
13. If you do not proceed the fine adjustment, check the load stability both in extreme and horizontal positions. The load must be stable in a chosen position, it means it must not move upwards or downwards. If the load is not stable, repeat the adjustment process.
14. Install the covers according to the chapter XVIII. INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS of this Installation Guide.




*Pic. 28) rough adjustment of compact arm with free vertical end*

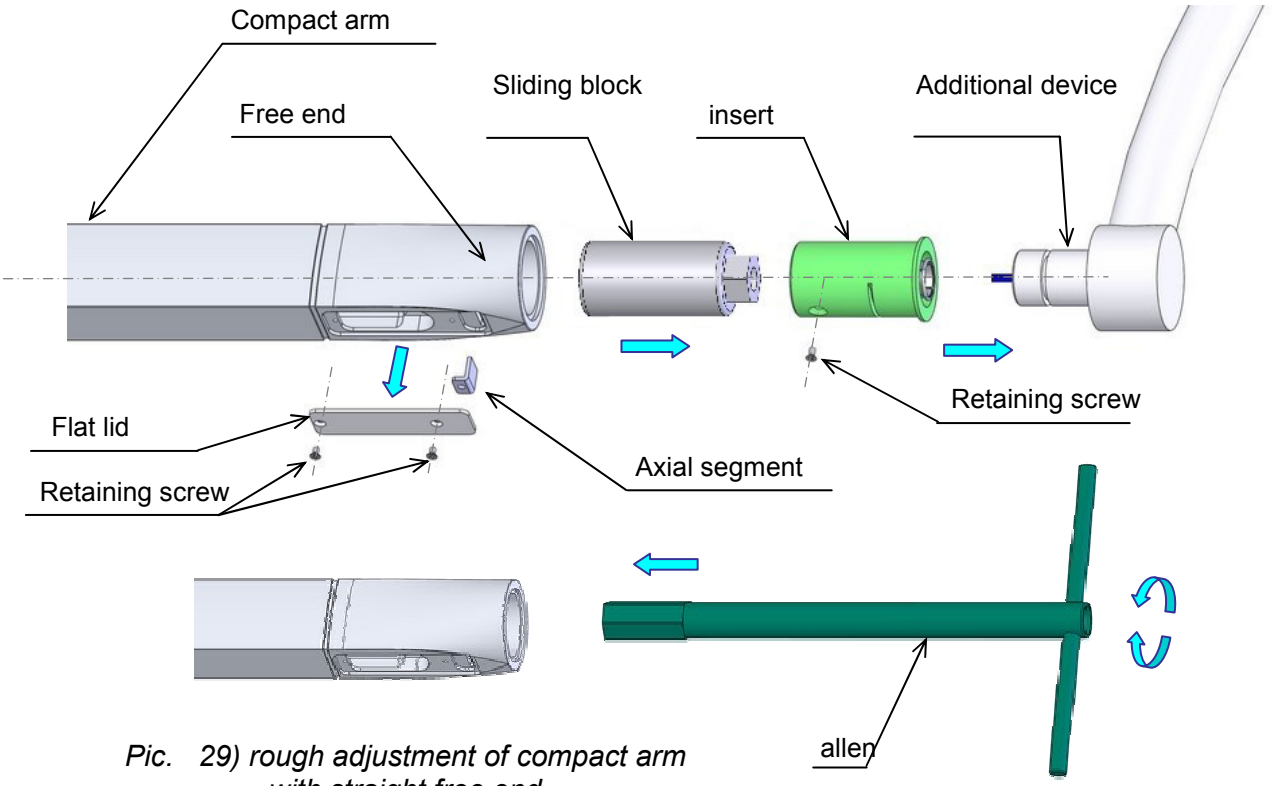
## *B. ROUGH ADJUSTMENT OF COMPACT ARM WITH STRAIGHT FREE END*

1. Unscrew retaining screws.
2. Remove the additional device together with inlay and axial segment.
3. Unscrew the retaining screw of rotary contact and remove the rotary contact from the free end.
4. Unscrew and consequently remove the sliding block using the spanner.

5. Insert the spanner into the compact arm and place it on the nut inside the compact arm.

6. Follow points 5 and 6 in paragraph A of this chapter.

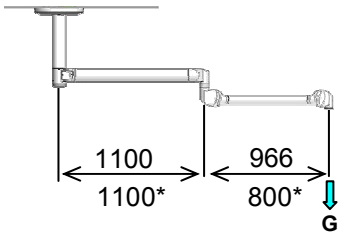
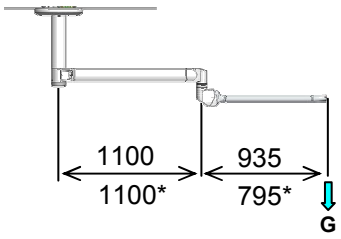
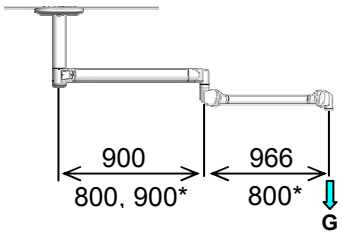
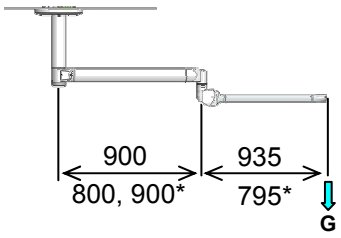
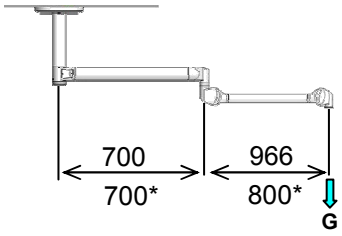
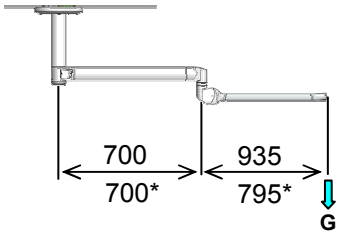
7. After setting the requested spring preload remove the spanner.
8. Insert the sliding block into the compact arm and tighten it so that it closely touches the nut.
9. Insert the rotary contact into the free end and fix it properly by the retaining screw.
10. Install the additional device according to chapter XV. INSTALLATION OF ADDITIONAL DEVICE – compact arms without stabilazer (straight free end) of this Installation Guide.




*Pic. 29) rough adjustment of compact arm with straight free end*

If SPR is being used, a revision of the electric equipment must be proceeded by the authorised subject after each rough adjustment before its using again.

*Tabelle 3) Maximum load capacity of spring arms*

| Compact arm with stabilazer | Compact arm without stabilazer | G spring arm load capacity range | |
|---|---|---|---|
| | | **SPR10** [kg] | **SPR11** [kg] |
|  |  | **5** to **23** | **0** to **14** |
|  |  | **5** to **28** | **0** to **14** |
|  |  | **5** to **28** | **0** to **14** |

** lengths of arms used in version **SPR11***

# INSTALLATION OF PLASTIC COVERS OF COMPACT ARMS

Plastic covers are installed on the compact arms in the final period of completing SPR.
There are covers of inner and end joints on the compact arm with vertical end, on the compact arm with straight end there is a cover of inner joint only.

**Installation of covers with faulty couplers or another damages is forbidden.**

**Couplers of all covers must lock together all along the surface contact.**

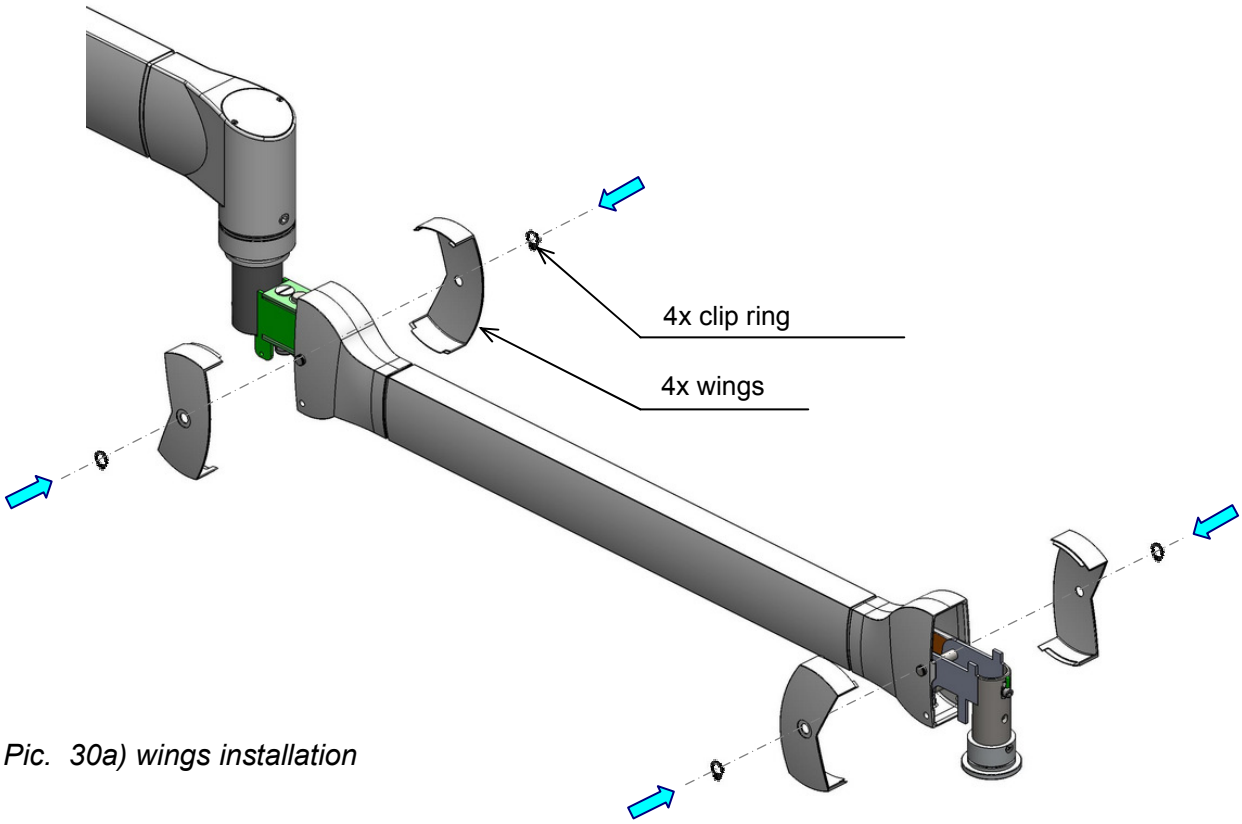
**Operating SPR without properly installed covers is forbidden.**

**MOUNTING OF JOINTS COVERS:**

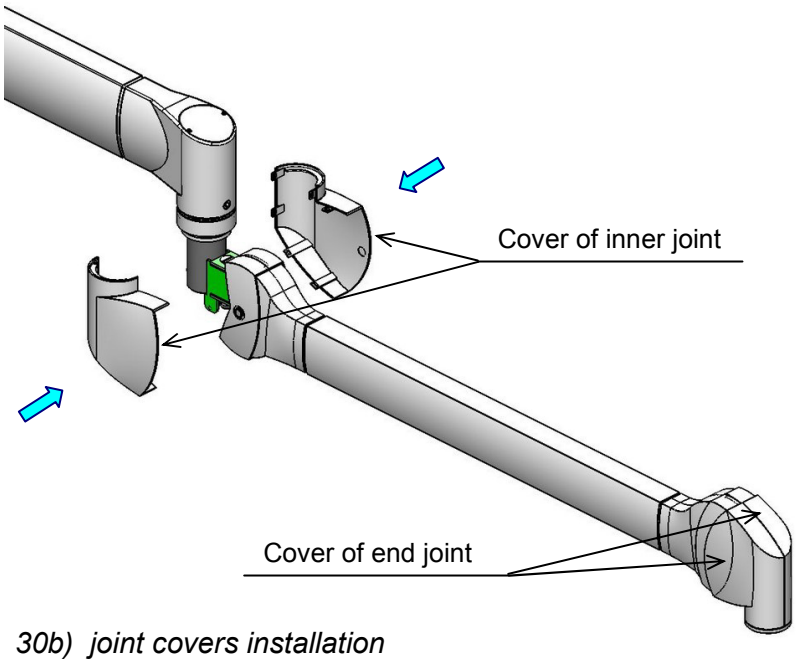
1. Place the wings on the pintles so that their interferences overlap at surface contact.
2. Fix the placed wings on the pintles by clip ring.
3. Place the the joint cover. The cover consists of two mirror halves. Place both halves of the cover to the inner joint and connect them by a gentle pressure together the way, that the inner rim of the cover fits precisely into the channel for the inner rim situated on the inner joint and all the couplers of both parts of the cover properly lock together. The cover is installed correctly when its both parts adjoin closely to the rotary and compact arms. To avoid the cover damage and/or its incorrect placing, never use a heavy force for cover installation.

**REMOVAL OF JOINTS COVERS:**

Remove the joint cover. The cover consists of two mirror halves. By gentle pressure of the fingers alongside the interfacial area of both the halves the couplers are released. Consequently hold each half by one hand and smoothly pull them apart, so that the couplers are not damaged.




*Pic. 30a) wings installation*




*Pic. 30b) joint covers installation*

# LOCKING THE COMPACT ARM IN POSITION

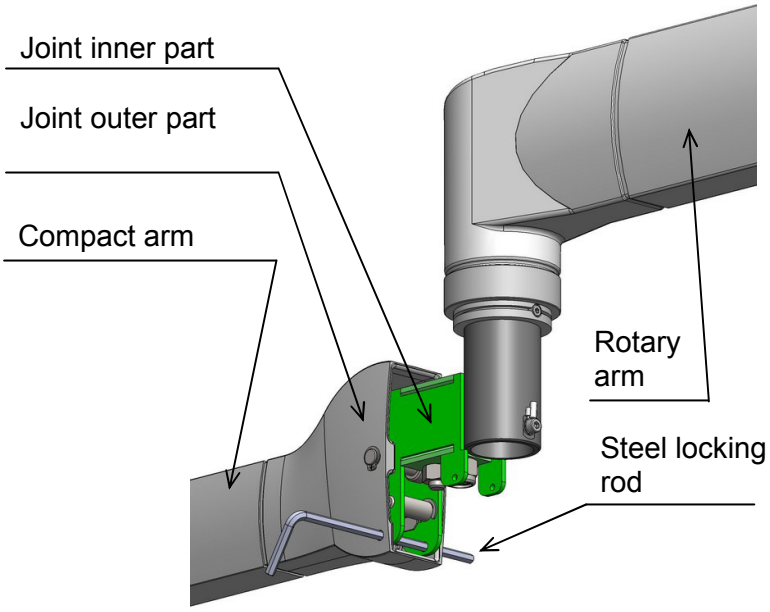
During the process of a rough or fine adjustment of the compact arm, the compact arm must be duly locked in a stabile horizontal position.

The locking is always made:

- without loads hanged on the compact arm
  *(Remove the installed loads from the compact arm as described in chapters XII. – XV. of this Installation Guide)*
- with removed inner covers (wings) of the joint cover
  *(Remove the wings from the compact arm inner joint as described in chapter XVIII. of this Installation Guide)*
- by using the locking rod (ø6 mm) – not being a part of a SPR supply set
- the locking rod is to be placed into a hole in an inner joint as demonstrated on *Pic. 31*

**The adjustment correction check is to be done without steel locking rod.**

**Operating SPR with the locking rod is forbidden.**




*Pic. 31) Locking the compact arm in position*

# ADJUSTMENT OF ROTARY JOINTS BRAKES RESISTANCE

The adjustment of the rotary join can be proceeded by the technically trained and authorized subject only.

The rotary joints brake prevents the arms from their self-motion.

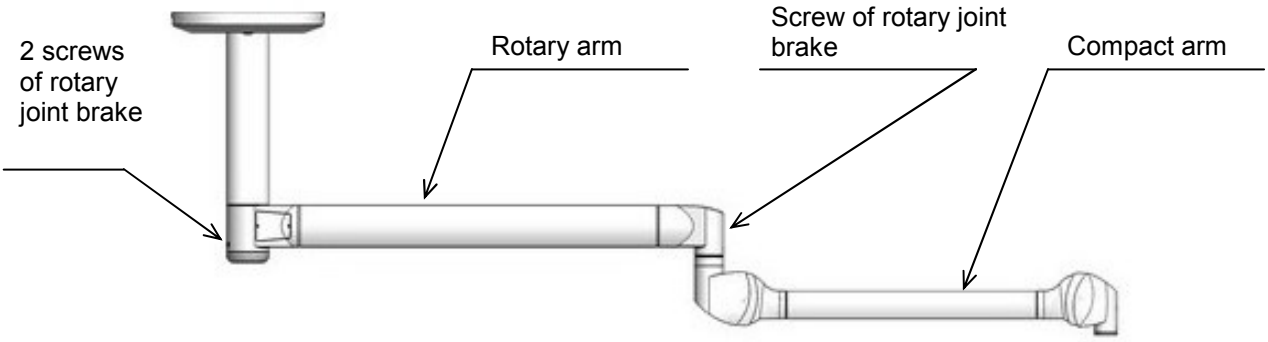
The regulation of the rotary joints brakes resistance is made by brakes screws changeover by imbus spanner.

The joint brake must not be removed or exceedingly loosed when operating SPR.

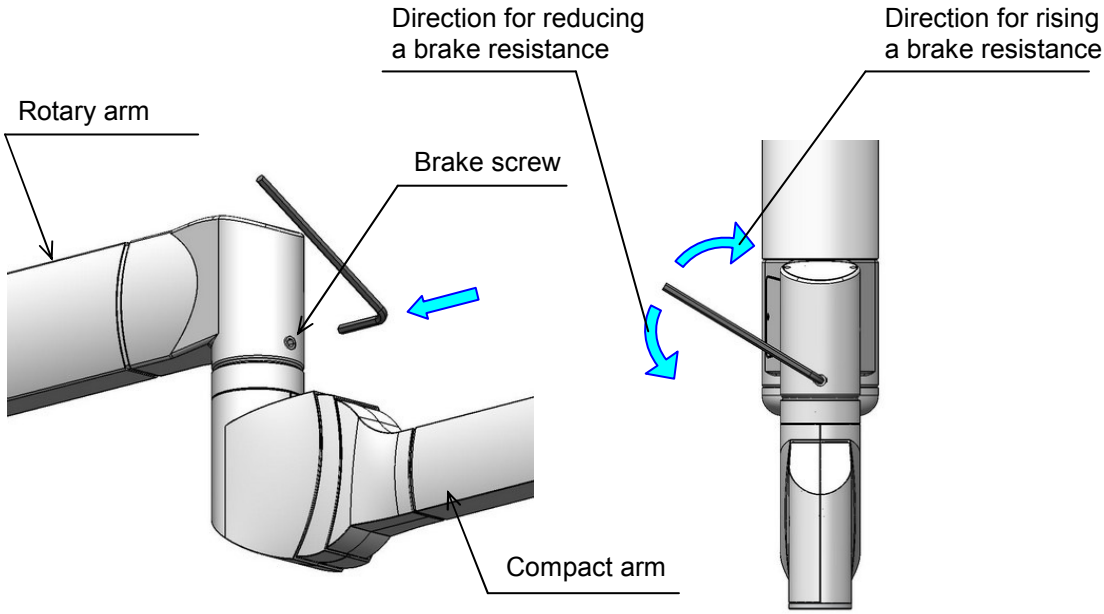
**PROCESS OF BRAKES RESISTANCE ADJUSTMENT:**

1. Rotate the brake screw (screws) by the imbus spanner (see Pic. 33)
   a. By rotating the screw from the right to the left, i.e. anti-clockwise, the brake resistance is reduced.
   *b.* By rotating the screw from the left to the right, i.e. clockwise, the brake resistance is raised

2. The brake on connection of the rotary arm and the central axis is composed of two screws. Adjusting of the brake do the way described in point 1 of this chapter. **Adjust both screws symetrically.**




*Pic. 32) Positions of brake screws*




*Pic. 33 ) Adjustment of brakes resistance*

# SETTING SPR INTO OPERATION

**Until the proper setting SPR into operation it must be visibly marked by information label „OUT OF ORDER“.**

Connecting SPR to the external installation is possible after complete installation termination only. Consequently the ceiling/wall cover must be installed.
User is responsible for setting SPR into operation. Company is obliged to request conformity with

performed subsystems directly connected to the external SPR installations, or having direct influence on it, and declare the completeness of the conformity by the appropriate form.

Proceeding the electricity revision related with setting SPR into operation according to he local national standards and testing SPR functionality is necessary to be done by subjects authorized for such activities.
Equipment of the concrete type and piece of SPR, defined by an order/project, and the respective interconnection, can be only reduced compared to the named schemes in accordance with a producer´s instructions.

Příloha 1 - Elektroschéma pro jedno rameno