

**ELECTRIC REMOTE CONTROLLED TWIN AGENT MONITORS A4-EI-TWIN TYPE**

**OPERATING AND MAINTENANCE HANDBOOK**

**A) TECHNICAL DATA**

Flanged inlet	4" or 6" ANSI 150 lbs RF DN 100 or DN 150 DIN PN 16
Max. working pressure	16 bar
Test pressure (mechanical strength)	24 bar
Test pressure (rotating joints tightness)	20 bar
Flowrate	2.000 lt/min.foam premix 20 kg/sec. dry powder
Type of operation	electric remote control by means of electric multiturn actuators IP 67, with integrated electric motors 24 V DC, 0,2 kW, (for mounting on fire fighting trucks), equipped with: - adjustable limit switches, - torque switches (overload protection), - thermostiches, - potentiometer for remote position control (on request), - handwheels for local manual operation of the monitor with automatic disconnection device while the monitor is electrically remote operated,
Horizontal movement	max.360° (adjustable)
Vertical movement	max.-15° / +70° (adjustable)
Locking device for horiz. movement	yes - self locking worm gear
Locking device for vert. movement	yes - self locking worm gear
Rotating joints	with ball bearings / needle bearings
Greasing nipples	yes - on horizontal and vertical rotating joints
Body material	anodized seawater resistant light alloy G-ALSi9 or bronze Bz N7
Pressure loss in the monitor	1 bar at flowrate 2.000 lt/min.
Horizontal rotation speed	180° in about 24 sec. (~7,5°/sec.)
Vertical elevation speed	90° in about 18 sec. (~5°/sec.)

## **B) PIPES AND NOZZLES**

- A type combined foam/water pipe with nozzle in anodized seawater resistant light alloy G-ALSi9 or bronze Bz N7 and pipe in stainless steel
- dry powder pipe in anodized light alloy

## **C) OPERATION OF THE MONITORS**

Caccialanza electric remote controlled monitors A4-El TWIN type are compact units for very high performances, designed to operate in extremely hard conditions and in aggressive environments (refineries, offshore).

### Electric remote control of the monitors

The monitors are electric remote controlled by means of 2 electric multiturn actuators with electric motors 24 V DC - 0,2 kW, one for the horizontal movement, one for the vertical movement of the monitor.

Each electric multiturn actuator is provided with adjustable limit switches (stop of the horizontal and vertical movements when the limit positions are reached), torque switches (overload protection), thermostiches and (on request) potentiometer for remote position control.

The monitors are operated from the electric power and command/control panel located inside the cabin of the fire fighting truck by means of the joy-sticks and pushbuttons aiming the jet at the fire or objective to be cooled.

By reaching the end positions the monitor stops automatically and the relevant control lamp is lighting.

### Local manual operation of the monitors

In case of electric supply failure or for local manual operation (for maintenance purposes), the monitors can be locally operated by means of handwheels directly mounted on the multiturn actuators. The handwheels are protected with a safety device which automatically and instantaneously disconnects the handwheel itself when it is remotely electric operated.

**Attention! - The manual operation should only be engaged if motor stands still.**

For manual operation of the monitor proceed as follows (fig.B):

- lift change-over lever in the centre of the handwheel to top dead centre while slightly turning the handwheel.
- release the change-over lever (snaps back to the initial position) - the manual drive remains engaged.

Disengage manual operation

- Manual operation disengages automatically when motor is started

**Attention! - During the local manual operation, pay attention not to overcome the end positions of the limit switches (mechanical damage of the limit switches!).**

## After the operation of the monitors:

- rinse the monitor with clean water, in particular after foam service
- drain the monitor in particular in case of cold weather
- check that the monitors have not been damaged during operation

## D) INSTRUCTIONS FOR ERECTION

### D.1 Mechanical installation on the main water supply pipe

The electric remote controlled monitors are supported by the main water supply pipe, with the interconnection of a suitable flange sized according to ANSI or DIN codes.

For mechanical installation of the monitors proceed as follows:

- clean all surfaces in contact with the gaskets
- use good quality gaskets
- use bolts according ANSI or DIN codes

**Attention! - For lifting the monitors use only by the special lifting eyebolts**

### D.2 Electric connection

**Attention! - Observe safety regulations**

When the monitor is installed, proceed with electric connection of the multiturn actuators to the main electric power and command/control panel.

**Attention! - It is very important to check that the cables have a length sufficient to allow the monitor to operate in the complete range of movements (rotation 360°, elevation -60°/+70°) and that the cables are free so that the monitor can move without interference.**

The time delay, i.e. time from torque switch tripping till the motor is switched-off, should not exceed 20ms. We recommend to switch off the corresponding contactor always directly by the limit or torque switch.

- check whether the power supply (type of current, voltage and frequency) suits the motor (refer to motor nameplate)
- take off plug or cover at terminal compartment
- loosen cheese head screws and remove socket carrier
- fix cable glands of size suitable to the cable outside diameter

**Attention! - Enclosure IP 67 is only guaranteed if correct cable glands are used**

Connection for 3 Ph AC motors (monitor wiring electrical scheme Dwg. A52310608T):

- connect the phases L1, L2, L3 to the terminals U,V,W (results in clockwise rotation). Connect the earth to the marked terminal

- connect the control wires according to above mentioned wiring electrical scheme

**Attention! - the two circuits of one switch are suitable only for the same potential.  
Different potentials require tandem switches!**

- **full motor protection is only guaranteed with correct connection of the thermostiches. If these are not connected, our guarantee for the motor is invalid.**
- **for connection of remote position transmitters (potentiometer) we recommend the use of shielded cables.**
- clean the sealing faces at the cover for the terminal compartment and check whether the O-ring is not damaged. Apply a thin film of non-acid grease (e.g. Vaseline) to the sealing faces
- place the cover and fasten the 4 screws firmly crosswise
- tighten the cable glands well to guarantee the enclosure IP 67.

### **D.3 Electric test run (fig.E - Dwg. A52310609Q)**

Remove the cover at the switch compartment.

The red test buttons T serve for operating the micro switches of torque and limit switching.

- bring manually the monitor to the intermediate position for elevation and rotation
- check the phase rotation by switching on the actuator briefly in one direction (e.g. "turn right"). If the sense of rotation is wrong, switch off immediately and interchange the motor connections U1 and W1
- turn the red test button "turn right" in direction of the arrow for DÖL
  - if the motor stops, the control circuit is correct
  - if the motor is not switched off, turn both test buttons in direction of the arrows for DÖL/DSR for emergency stop
  - in this case, check the control circuit and set it right
- determine the overrun in both directions (the overrun is the travel from the switching off till the movement stops)

### **E) SETTING OF THE LIMIT SWITCHING (fig.E - Dwg. A52310609Q)**

#### **E.1 Monitor multiturn actuator for horizontal movement**

Setting for end position of "turn right"

- engage the manual drive as explained under par.C
- turn the handwheel clockwise till the pipe or nozzle of the monitor has reached the desired end position of "turn right" (consider the possible overrun as determined under par.D.3).
- press down and turn the spindle A in direction of the arrow. The ratchet is felt and heard, the pointer B turns for every 90°. When the pointer moves towards point C, the spindle should not be turned any further.  
If the spindle has been turned beyond that point inadvertently, continue turning and approach the setting point again.

**Attention! - Make sure that the spindle A jumps out by spring force to its original position.**

Setting for end position of "turn left"

- engage the manual drive as explained under par.C
- turn the handwheel anti-clockwise till the pipe or nozzle of the monitor has reached the desired end position of "turn left" (consider the possible overrun as determined under par.D.3).
- press down and turn the spindle D in direction of the arrow. The ratchet is felt and heard, the pointer E turns for every 90°. When the pointer moves towards point F, the spindle should not be turned any further.  
If the spindle has been turned beyond that point inadvertently, continue turning and approach the setting point again.

**Attention! - Make sure that the spindle D jumps out by spring force to its original position.**

## **E.2 Monitor multiturn actuator for vertical movement**

Setting for end position of "turn up"

- engage the manual drive as explained under par.C
- turn the handwheel clockwise till the pipe or nozzle of the monitor has reached the desired end position of "turn up" (consider the possible overrun as determined under par.D.3).
- press down and turn the spindle A in direction of the arrow. The ratchet is felt and heard, the pointer B turns for every 90°. When the pointer moves towards point C, the spindle should not be turned any further.  
If the spindle has been turned beyond that point inadvertently, continue turning and approach the setting point again.

**Attention! - Make sure that the spindle A jumps out by spring force to its original position.**

Setting for end position of "turn down"

- engage the manual drive as explained under par.C
- turn the handwheel anti-clockwise till the pipe or nozzle of the monitor has reached the desired end position of "turn down" (consider the possible overrun as determined under par.D.3).
- press down and turn the spindle D in direction of the arrow. The ratchet is felt and heard, the pointer E turns for every 90°. When the pointer moves towards point F, the spindle should not be turned any further.  
If the spindle has been turned beyond that point inadvertently, continue turning and approach the setting point again.

**Attention! - Make sure that the spindle D jumps out by spring force to its original position.**

## **F) SETTING OF THE TORQUE SWITCHING** (fig.F - Dwg. A52310609Q)

**Attention! - The adjusted torque must suit the monitor parameters.**

**The setting of the torque value suitable for the monitor was done during final testing in the factory. This setting should only be changed with the consent of the monitor manufacturer.**

- loosen both lock screws O at the torque dial
- rotate the dial P to the required torque setting (1 da Nm approx. 1 mkp or 7,4 lbs.ft)
- fasten the lock screws O again.

**Note : The torque switching works also in manual operation.**

**The torque switching acts as overload protection over the full travel, also when stopping in the end positions by the limit switch.**

- clean the sealing faces at the housing and at the cover and check whether the O-ring is in good condition. Apply a thin film of non-acid grease to the sealing faces.
- place the cover and fasten the hexagon screws crosswise.

## **G) SETTING OF THE POTENTIOMETER** (if provided)

- operate the monitor in the motor drive to the respective end position ("end position right" or "end position up")
- bring the potentiometer to the initial position ("end position right"=0% - "end position left"=100% or "end position up"=0% - "end position down"=100%) by turning at the spindle R2
- when using the AUMA power supply unit PS 01 and the position indicator with percentage scale, do sharp tuning at power supply unit
- operate the monitor in motor drive to the end position "left" or "down"
- adjust the max. value at the power supply unit till the position indicator shows 100%

## **H) MAINTENANCE**

### **Mechanical parts**

- inspect and lubricate the monitors after each operation and latest every 6 months
- lubricate the ball bearings and the needle bearings on the rotating joints by means of the greasing nipples and grease the worms gears

### **Electric actuators**

The electric multiturn actuators need only little maintenance. Precondition for a reliable service is a correct commissioning. It is also very important that the O rings at the covers are placed correctly and that the cable glands are fastened firmly to prevent the entrance of dirt or water.

We recommend:

- if operated very seldom, perform a test run every six months. This assures that the actuators are always ready to operate
- Approximately 6 months after commissioning and then every year check the bolts between the actuator and the monitor worm gear box for tightness. If required, retighten.

The gear-housing was filled with lubricant in the manufacturer's factory.

This filling lasts for several years of service.

However, the frequency of maintenance interventions has to be chosen strictly in accordance with the use of the fire fighting monitor.

Continuous intervention of the unit, sudden changes in temperature or other particular environmental conditions may require maintenance interventions with higher frequency.

#### **REFERENCE DRAWINGS**

Dwg. A52310608T - Electric scheme for A3-EI and A4-EI monitors wiring

Dwg. A52310609Q - A3-EI and A4-EI electric remote controlled monitors - figures "E"+"F" -

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