Central Fast Locking devises (Manholes) serve the purpose of work facilitation by rational technique, that enables a rapid and safe opening and locking of vessel inlets and outlets.

Although the construction has been well-tried and time-tested, it has been continuously improved by AWE.

This has resulted in diverse variants as to size, pressure rating and connecting facilities.

The designs range from carbon-steel to stainless-(austenit)-steel in standard, as well as sterile or pharmaceutical quality.

Ordinarily our devices are operated by hand, there are, however, also automatically functioning AWE Manholes available.

Every Manhole supplied by AWE is tested and checked by german TÜV (Technischer Überwachungsverein = Association for Technical Inspection)
Safety facilities of the hand-operated “AWE Manhole” fixed cover but not fully opened

In contrast to traditional manholes with separately functioning locking elements, the hand-operated AWE-Manhole has a centrally functioning adjustable locking lever, which enables shorter opening and locking times.

Consequently, it falls into the category of manholes according to German standard AD 2000 Memorandum A 5.

Cover stopped by hydraulic system

The individual components are mechanically tooled at the power transmission points and guarantee a constant distribution of load-dispatching based on the tolerances provided.

The cover is evenly pressed on the sealing by the ball-bearing suspension of the locking lever.

A plane assembly between cover, sealing and locking-ring is also ensured by the adjustable, slightly elastic bearing in the hinge.

The insertion of all lock levers can be visually checked, since there is a sufficient distance between locking-ring and lid-covering.

The insertion depth of all lock levels can additionally be checked by means of a visual indication.

In a closed position this may measure a maximum of two millimetres.

The milling-machine-cut edges of the locking lever effect an additional centring of the cover in the locking-ring.

On the outside there is a final switch which meets the requirements of VDE 0116 and is set off by a locking lever when it reaches the final position “OFF”.

Closed AWE - Manhole
As long as the locking position is not reached, the process operation must not be started or a pressure build-up commenced.

**Safety Precaution against Opening under Pressure.**

**Pressure warning device (electrically operated)**

After release by the facilities triggered off by the internal pressure an electrical-magnet, the star-shaped handle then is set off in the opening direction (i.e. anticlockwise)

**Pressure warning device (by means of a ball-switch)**

By means of a hand-operated ball-switch whose operational lever reaches into the stars-shaped handle of the locking device.

Before setting the Manhole into motion it must be checked whether the pressure vessel is under no pressure. The ball-switch can only be operated in the open position of the star switch.

**Opening and Locking procedure**

The locking levers of the Manhole are shaped in such a way that in the process of opening the cover is moved 2 millimetres from the locking ring and thus causes a pressure adjustment. This aperture is created by about two turns of the Manhole and by a probably existing remaining pressure.
**Operational stages of opening and locking**

During the first turning the locking level remains completely inside insertion device, only the adhesion power of the cover is reduced.

The next two turns cause a total power relief, but still prevent the lid from being removable.

Only some further turns withdraw the locking lever completely.

The locking procedure takes place in a reverse order. The adhesive pressure necessary for making the device air-tight can be set infinitely variable.

The necessary locking power is minimal.

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**Catching device** (Optional).

*(Prevents the cover from being ejected by a probably remaining pressure)*

**Function:**
If in the process of opening the Central Locking the cover is pressed in the opening direction, the catching device engages in the locking ring. Even if the locking devices are no longer in the insertion position the catching device prevents the cover from striking against something. Only when after the release of the remaining pressure the cover rests on the washer by its own weight the catching device is released by turning the star-shaped handle twice to the right. Thus the latches of the catching device are debarred; the stars-shaped handle must be turned left and the opening process is finished.
**Return Flow Prevention** (Optional)

**Prevents the handling of the star-handle if there is a remaining pressure of more than 0,2 bar.**

**Function:**
A diaphragm presses a saw tooth axle in the opposite saw-teeth of the thread screw (in the presence of remaining pressure).

The axle is connected with the central nut by a square-headed bolt and is thus prevented from turning in the opening direction. The turning in the locking direction, however, is possible by means of the saw-teeth. Only if the remaining pressure is lower than 0,2 bar, a spring releases the engagement of the teeth.

**Safety Precaution of the automatically operating AWE Manhole** (Optional)

In case of the automatically functioning **AWE Manhole** the central nut is run by an electric power source. It must be safeguarded by at least two devices steered by the internal pressure that the pressure balance with the atmosphere has been achieved.

After the release of the devices steered by the internal pressure the operation of an electrical-magnet (that operates without electricity) effects the central nut. After that the electric motion of the Central Locking takes place. Switching off in the position “ON” by means of the position switch.

In the position “OFF” by means of the adjustable torsion switch. The cover is opened by a pneumatic power source.

**The process of locking**

In the process of locking the final position is controlled by the end switch which is placed outside and operated by a locking lever in the position “OFF”. As long as the locking position is not indicated the process steering must not be put into operation or the pressure build-up set in motion.

**Standard Mode**

**Material and material evidence.**

Pressure bearing components of the Manhole (cover, locking ring, thread screw, locking lever, case, flange and thread screw nut) are made of austenit materials according to standard industrial norm regulation 17440. Evidence of the quality characteristics according to german standard AD W 2 Table 2

**Sealing**

Round cord 8 millimetres optionally geared to the pertinent medium, made of silicon rubber, Viton, Perbunan, PTFE and PTFE-coated. Special sealing by the company GDF Sealing reference 6 N / mm
**welding data**

Welding components meant or pressure bearing parts are guaranteed weldable. Welding procedure, additional materials and heat-treatment are geared to the raw material and component geometry employed.

Special surface treatment are dealt with in accordance with customer specifications. (Glasbead-blasting, dipping and grinding.)

**Checking procedure**

Welder test: in accordance with DIN 8560 / EN 287.
Weld joint factor: 0,85
Length welds: X-ray or fluoroscopic examination of 2% of the weld.
Round seams and others: to be checked along with the length seams.
Stubs: spot checking of dye-colour penetration testing.
Delivery regulations: according to pressure vessel regulations.

**Instructions**

Taking-over and Acceptance test: According to AD-2000 Memorandum A5, TRB 402, TRB 404
Putting into operation: Only in line with assembly instructions.

**Maintenance**

a) Abration limit for the thread screw nut in an axial direction: 1 mm
b) Abration limit for ball suspension of the locking lever in all directions: 1 mm
c) Aperture between the locking ring and the locking lever in the position “OFF”: maximal 2 mm
d) Cover hinge spring check for cracks. If the spring breaks, there is an increased danger of an accident, because the locking will strike unbraked.

**Repairs**

Should only be performed by trained specialists.

If the present information (descriptions and drawings) should prove to be insufficient, please phone our Service Department who will be delighted to assist you.